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On the importance of primary and community health care in relation to global health and environmental threats: lessons from the COVID-19 crisis

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On the importance of primary and community health care in relation to global health and environmental threats: lessons from the COVID-19 crisis

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4. Key words: Community health, Public Health, Primary Health Care, global environmental health, sentinel doctors for the environment, global climate change,

5. List of Abbreviation

- **CC:** Climate Crisis
- **COVID-19:** Coronavirus Disease 2019
- **EPH:** environmental public health, which focuses on primary prevention and protection of population groups from environmental threats to their health and safety
- **ERFs:** environmental risk factors
- **FDs:** family doctors
- **FPs:** family paediatricians
- **HEAL:** Health and Environment Alliance
- **HICs:** High Income Countries
- **ISDE:** International Society of Doctors for the Environment
- **LMICs:** low and middle income countries
- **NCDs:** non-communicable diseases
- **OECD:** Organisation for Economic Co-operation and Development
- **OH:** occupational health
- **P&CHC:** primary and community health care; Primary health care¹ in view of a Community health² perspective
- **PHC:** primary health care¹
- **SARS-CoV-2:** Severe Acute Respiratory Syndrome coronavirus 2
- **WHO:** The World Health Organisation
- **WONCA-ENV:** World Organization of Family Doctors, (WONCA Working Party: Environment)

¹ Primary health care is a whole-of-society approach to health and well-being centred on the needs and preferences of individuals, families and communities. It addresses the broader determinants of health and focuses on the comprehensive and interrelated aspects of physical, mental and social health and wellbeing. It provides whole-person care for health needs throughout the lifespan, not just for a set of specific diseases. Primary health care ensures people receive comprehensive care - ranging from promotion and prevention to treatment, rehabilitation and palliative care - as close as feasible to people's everyday environment (WHO, 2019)

² environmental, social, and economic resources to sustain emotional and physical wellbeing among people in ways that advance their aspirations and satisfy their needs in their unique environment (WHO, 1998)

Title:

On the importance of primary and community health care in relation to global health and environmental threats: lessons from the COVID-19 crisis

Abstract

In the course of the COVID-19 pandemic, it has become clear that primary healthcare systems play a critical role in clinical care, such as patient screening, triage, physical and psychological support, and also in promoting good community advice and awareness in coordination with secondary health care and preventive care. Because of the role of social and environmental factors in COVID-19 transmission and burden of disease, it is essential to ensure that there is adequate coordination of population-based health services and public health interventions.

The COVID-19 pandemic has shown the primary and community health care (P&CHC) system's weaknesses worldwide. In many instances P&CHC played only a minor role, the emphasis being on hospital and intensive care beds. Political failures compounded this in supporting local community resilience.

Placing community building, social cohesion, and resilience at the forefront of dealing with the COVID-19 crisis can help align solutions that provide a vision of “planetary health”. This can be achieved by involving local well-being and participation in the face of any pervasive health and environmental crisis, including other epidemics and large-scale ecological crises.

This paper proposes that P&CHC should take on two critical roles: first, to support local problem-solving efforts and to serve as a partner in innovative approaches to safeguarding community well-being; and second, to understand the local environment and health risks in the context of the global health perspective.

We see this as an opportunity of immediate value and broad consequence beyond the control of the COVID-19 pandemic.

Summary Box

- In 1978, the Alma Ata (Kazakhstan) declaration asserted the strategic importance of high-quality primary health care in the creation of effective and responsive health care systems. Unfortunately, 42 years later, this vision has not been attained yet.
- In October 2018, health experts and policymakers met in Astana (Kazakhstan) to renew the commitment for comprehensive available health care to all, reaffirming the commitments to the Alma-Ata core principles.
- The lack of involvement of the primary and community health care (P&CHC) systems during the COVID-19 pandemic has highlighted their crucial role in clinical and public health functions such as diagnosis (screening), triage, contact tracing, and in the short and long-term physical and psychological monitoring and management of patients. The current

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3 emergency has also shown the need for P&CHC to work in coordination with other health
4 care and public health organisations at the community level.
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- 8 • There is an urgent need for environmental public health policies with an intersectoral and
9 global perspective acknowledging the influence of the environment and the need to act at
10 the community level. Besides the traditional focus on the individual, it is essential that
11 public health agencies encourage and promote the involvement of P&CHC within the
12 framework of community and environmental health. The value of this has been highlighted
13 by the response to COVID-19, but it is equally central to the management of other crises
14 affecting communities.
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1. Introduction and objectives

The novel Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) and its resultant COVID-19 disease is the most challenging health emergency faced by humanity in living memory. This pandemic represents a grave threat to global health, economy and the social well-being of people.

The COVID-19 pandemic has emphasised the crucial role that primary and community healthcare (P&CHC) systems [1,2] could play in diagnosis or screening and triage, as well as in the short and long-term monitoring of the physical and psychological conditions of those affected. The current emergency has also highlighted the need for P&CHC to work on tracing and management of contacts in coordination with other health care organisations such as local and national public health institutions, [3,4] as well as those at the community level [5] such as community-based civil society groups and community health workers.

Because of the role of social and environmental factors in COVID-19 transmission and in the burden of disease, it is essential to ensure that population-based health services and interventions are adequately prioritised and coordinated between P&CHC providers, and public health organisations.

There are recognisable dimensions to the complex domain of how decisions are made to manage rapidly emerging problems. Each approach to crisis management has its merits, and they are all interconnected.[6] The role of P&CHC is central to the effective management of any health crisis.

Despite historical and ongoing discrepancies between and within the policy and scientific communities, mainly due to the complexity mentioned above, the pandemic has shown the importance of facilitating the interrelationship and mutual support between the health, social, environmental, and political-economic domains.

The goal of this article is to highlight the crucial role that P&CHC could play in managing the COVID-19 pandemic, in addressing key environmental and social aspects involved in viral transmission, and assist in the design of the interventions to control it. The article discusses how the success of such interventions depends on an overall vision of integrating environmental health with social and health care. It makes the case that enhancing such capacity now will have a more comprehensive benefit for better addressing this crisis and others in the future.

We lay emphasis on the importance of a multidisciplinary and effective workforce in environmental public health (EPH),[7] in collaboration with P&CHC and hospitals.

The COVID-19 pandemic is not the only concern we address with this proposed strategy; this is an exemplar of a “stress test” of global health and environmental threats

2. SARS-CoV-2 and COVID-19: an example of environmental and socio-political imbalance

The origin of SARS CoV-2 and the subsequent COVID-19 pandemic, have revealed the precariousness of the systems upon which trade, food, energy, transportation, and social safety and security nets depend.

The reported origin of the current pandemic emphasises the exceptional relationship that exists between the environment, animal and human health (One-Health approach).[8] Recent evidence suggests that SARS CoV-2 emerged from transportation and trading of wild animals in wet markets.[9] About one billion cases of illness and millions of deaths occur every year from zoonoses, which comprise about 60% of all emerging infectious diseases globally.[10] The majority of these (60.3%) are caused by zoonotic pathogens, out of which 72% have a wildlife origin.[11] Ecosystem health, wildlife health and human health are increasingly interconnected, leading to an urgent need to develop locally and globally coordinated plans for better addressing the impacts of environmental change on zoonotic and parasitic infections,[12] including COVID-19.[13]

Local, national, large scale and systemic environmental changes and disruptions, such as biodiversity loss, disruption of natural habitats, extinction of species, climate crisis, pollution, together with societal and demographic changes (e.g. urbanisation, increase in mobility, population aging) are likely determinants of different epidemics.[14] Both environmental and social factors play an important role by facilitating the occurrence of new or re-emerging infectious diseases, and/or by greatly modulating their health impacts.

3. Global/Local, two sides of the same coin

The way in which the COVID-19 crisis developed in time and space made clear that the distinction between local and global has become largely unimportant.[15] The local ecological wildlife and human interactions in Wuhan, China, have been recognised as the origin of the SARS-COV-2 spillover, which afterwards quickly spread across the globe. Such local incidents are related to global environmental issues such as ecological erosion and the climate crisis. Within a global political and economic order that promotes unsustainable practices, regional and local political and economic decisions lead to deforestations, intensive farming, unsustainable energy production, air pollution, deterioration of water and soil, all of which contribute further to the global ecological and climate crisis, increasing the likelihood of emerging global impacts in the future. [16]

And while global system level change is needed, communities can also play an important role in helping to address environmental problems at multiple levels. P&CHC can contribute to addressing such global challenges, with the view of prevention and protection from harm of communities, with global benefits by sharing of experiences and expertise to improve competencies and capabilities at the local level.

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3 These efforts are not at all simple to deploy for many reasons such as the overall organisation or
4 conflicts between science and politics. Some tragic and clear examples across the world are here
5 provided by references.[17-19]
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10 The uneven distribution of COVID-19 cases and severity of the disease,[20] are determined by
11 socioeconomic circumstances, inequality associated with poor working and living conditions,
12 access to services, mobility, and pre-existing health conditions associated with deprivation.[21]
13 Populations lacking access to health services in normal circumstances are left most vulnerable
14 during times of crisis,[22] and addressing such social determinants and inequities is part of the
15 challenge of P&CHC at global level and first and foremost at local level.
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20 **4. Primary and Community Health Care as a cornerstone to address global** 21 **issues at the local level** 22

23 P&CHC has historically had a crucial role in communities dealing with global challenges. Societies
24 are ageing, with many facing increasing rates of obesity, non-communicable diseases, and new
25 and reemerging infectious diseases, with health spending rising. [23] It is therefore, imperative to
26 redesign health systems that contribute to community health by addressing environmental
27 factors. [16] The rapid spread of COVID-19 added complexity to these challenges. A
28 multidisciplinary P&CHC workforce can play a vital role in recognition and management of
29 environmental and social factors of community health. Family doctors (FDs) and family
30 paediatricians (FPs) are usually the first contact point for patients, even in the current pandemic,
31 especially in high-income countries (see Section 6.3 for considerations more specific to LMICs).
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36 **4.1. Health impacts in different settings of Primary and Community Health Care** 37 **approach** 38

39 The main critical threat of the COVID-19 pandemic was likely due to the potential collapse of the
40 health service. This has been extensively investigated worldwide.[24, 25] The Italian experience is
41 an example.
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44 Italy was the first European country involved in the pandemic and has been one of the worst
45 affected. The first confirmed cases were detected on 31/1/2020. Later a cluster of cases with the
46 first deaths was identified in a Northern region (Lombardy). The virus had spread to the
47 neighbouring region Veneto, but not initially to other areas of the country.
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51 The Italian health care system is highly decentralised; different regions implemented different
52 policy responses to COVID-19. The most notable example is the contrast between the approaches
53 adopted by Lombardy and Veneto, two neighbouring regions with similar socioeconomic profiles.
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56 Lombardy, one of Europe's wealthiest and most industrial productive areas, was
57 disproportionately hit by COVID-19. Veneto, which is similarly wealthy, by contrast, fared
58 significantly better. In the second wave of the pandemic in Autumn, Lombardy scored at the
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3 highest level of risk [26]. At present (December 28th, 2020), the situation is changing, arguably
4 linked to many contributing factors (virological, organisational), which are under investigation.
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7 The spread of COVID-19 and the policy measures taken in these two regions were shaped by a
8 multitude of factors, including the different public health management choices applied in each
9 region.[27] Interventions in Lombardy – like in other regions which experienced much larger case
10 fatality rates – were based mainly on hospital activities.[28] The region of Veneto, at least in the
11 first half of the year 2020, relied more on the involvement of primary care doctors, with resulting
12 lower health impacts. While the situation is more complex with many factors (such as
13 socioeconomic, organisational, infrastructure, public health surveillance) contributing to the
14 observed differences in health impacts, this experience highlighted the importance of P&CHC as
15 the frontline in dealing with health crises.
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20 **4.2 Connections of Primary and Community Health Care**

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22 The connection between P&CHC and occupational health (OH) is well established. This is
23 important for better prevention of chronic conditions (such as musculoskeletal or mental health
24 disorders) that lead to absenteeism or early departure from the labour force [29]. Efforts to
25 improve workers' physical and mental health include raising awareness among managers,
26 improving the physical working environment, humanising social relations at work, and offering
27 programmes dedicated to encouraging disabled people to return to work. Equally important is the
28 health surveillance of workers especially for physical, chemical, or biological hazards at work.
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33 In this respect, COVID-19 presents an almost unique instance where occupational and
34 environmental risks factors have overlapped, generating a health, social and economic impact of a
35 magnitude not seen before. Failure of OH control at work will affect many individuals; failure of
36 control in the community will result in many sick workers. Hence the close coordination between
37 P&CHC, OH, EPH and enforcement authorities is essential.[30]
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41 P&CHC can play two critical roles: one, as partners to public health policymakers and agencies in
42 contributing to monitoring impacts and serving as an "anchor institutions"[31] for implementing
43 local solutions and innovative approaches to safeguarding community health; and two, an
44 essential role in community building, social cohesion, and resilience.[32]
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49 **5. Primary and Community Health Care: the linchpin connecting 50 environment and health**

51 COVID-19 severity and fatality has been shown highest amongst those made vulnerable by less
52 favourable structural social conditions [22]. The unequal distribution of health and mortality
53 burden disfavours those most vulnerable between and within countries and communities,
54 shows similarities across the spectrum of health conditions – these being communicable or non-
55 communicable. [33, 34]
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In the case of COVID-19 the term “syndemic” has been cited as the health burden has been beyond the number of cases of infection, and has extended to several non-communicable disease (NCD) aspects.[35] First, biological and social interactions of COVID-19 with underlying non-communicable health conditions often lead to more serious, including lethal, disease progression. Second, services for NCDs have been considerably disrupted in three quarters of countries globally [36] with associated impacts. As environmental factors are estimated to account for at least 25% of the preventable burden of disease, including NCDs [37], a perspective for primary prevention of community disease burden cannot ignore environmental public health.

The health effects associated with environmental risk factors, usually quantified through mortality, emergency visits and hospitalisations are underrepresented, as many illnesses treated by FDs or FP are missed in these numbers.[38] For example, vector-borne infectious diseases show a geographical heterogeneity linked to climate crisis.[39] In these cases, global strategies addressing climate crisis can and should be implemented locally. The role of local community-based FDs and FPs is essential, in what they can do to encourage mitigation of climate crisis, and to assist communities in their adaptation efforts. A clear and comprehensive example of the activities which could be carried out within the P&CHC framework to address global environmental risk factors is provided in Table 1.[40]

Table 1. P&CHC role in relation to global health threats

- **Public education and raising awareness**
- **Day-by-day involvement in local/regional/national strategies to tackle antimicrobial resistance within a One-health approach**
- **Early alert systems: impending weather extremes, infectious disease outbreaks**
- **Disaster preparedness, including increasing the health system's 'surge' capacity to respond to emergencies**
- **Enhanced infectious disease control programmes**
 - **food safety, vaccine programs, case detection and treatment**
- **Improved surveillance**
 - **vector control**
 - **risk indicators (e.g., aeroallergen concentration)**
 - **health outcomes (e.g. infectious diseases outbreaks, rural suicides, seasonal asthma peaks)**
- **Appropriate health workforce training, including continuing professional development (e.g. updated understanding of climatic influences on health, training in public health)**

Source: Blashki et al. 2007 [40] adapted.

6. Implementing stronger primary and community health care

New approaches can be implemented as preventive health/care measures, with a broad integrated perspective. Action is needed at multiple levels, and which is attuned to different contexts.

6.1. Local-national level

A policy survey conducted by the Organisation for Economic Co-operation and Development (OECD) [1] suggests that key policies and strategies delivering better P&CHC should be based on:

- **New models of care:** rather than the single-practice physician, Multidisciplinary health teams, supported by digital technology should be pro-actively engaged in preventive care. [41]
- **More economic incentives:** to encourage P&CHC to work in teams and focus on prevention and continuity of care.
- **A broader role for patients,** including involving the patients in the co-management of their health.

Digitalisation is essential to integrate P&CHC further at the community level. "Precision public health" is an approach which uses data from traditional and emerging sources, for example big-data to target interventions for populations by person, place, and time.[42] With such approach, supported by strong empirical foundations, electronic health records from P&CHC, especially if in combination with data on environmental circumstances represent an essential source of data and understanding at the local level.[43]

As such, FDs and FPs could play a crucial role in connecting global concerns with local actions through the information they provide, which can build evidence base needed policy, in addition to their important role in community awareness and attitudes.[44]

EPH at the level of primary health care could be strengthened through agreements with:

1. **Employers of primary care staff (usually in the public sector),** to modify contracts and job descriptions of selected currently employed P&CHC staff to identify tasks related to environmental public health aspects of community health.
2. **Universities and other agencies required for provision of training** of P&CHC staff, to identify appropriate competencies and standards required, and develop related training programmes to enable them to perform the tasks as in (1). It is possible that a first cohort of P&CHC staff may not have acquired sufficient training in environmental public health in the absence of formally recognised training programmes, so this aspect will concern successive cohorts; furthermore, life-long learning would drive towards a larger number.
3. **Professional registration bodies,** such as Ordine dei Medici/General Medical Council and other professional registration authorities, depending on country and type of profession,

[45] to conduct and conclude negotiations with employers and universities/training agencies for skills and competencies required to achieve registration of staff who have completed training as in (2) as part of their professional qualification.

4. **Health agencies** to promote secondary use of electronic health records data from primary and community care facilities and linking that to other data relating to the environment.

6.2. International level

International organisations should provide a framework where the crucial role of P&CHC in EPH is emphasised especially with respect to data sharing, responsibilities, capability and consistent capacity building. The following organisations are already dealing with such issues, and should be encouraged to develop such framework with a collaborative perspective.

The World Health Organisation (WHO) stated that a vision for PHC in the 21st century must be based on individuals and communities as a unique focus.[46]

WONCA (World Organization of Family Doctors) is an international organisation that aims at improving the quality of life by fostering high standards of care in general practice/family medicine considering the environment.[47]

Health and Environment Alliance (HEAL) is the leading European not-for-profit organisation addressing how the natural and built environments affect health in Europe.[48]

International Society of Doctors for the Environment (ISDE) was founded 30 years ago, aiming at educating physicians and the general public.[49]

6.3. Low and Middle Income Countries

Particular attention must be paid to LMICs with populations and economies more vulnerable to the immediate effects of the climate crisis and zoonotic-parasitic infection, and the long-term health, social and economic impacts of the current pandemic, and more generally to the difficulties towards a sustainable and equitable development.

Integration of PHC in view of a community health perspective in LMICs is complex. As such, two points [1] should be raised:

1. **Data:** Many LMICs lack sufficient data on PHC performance; with some countries lacking even basic vital registration data.[50]

Data gaps that influence PHC systems can be found at any level and dimension of the health system, including aspects of governance, leadership, and population health management.

2. **Integration:** Integrating a PHC system is a combined effort, and there is no single tool to achieve this. The PHC systems design approach must be strengthened, incorporating human resources for health, financing, facilities, private sector, and demand to develop and enhance integrated systems.

PHC is mainly based on the awareness of the socioeconomic, capacity and cultural/historical features in which the FDs work. As such, according to the Astana declaration,[51] a holistic approach must integrate efforts to deal with other primary conditions such as malnutrition, waterborne diseases, and infectious diseases which disproportionately impact LMICs.

According to OECD,[1] in LMICs' attention needs to be directed to:

- district management systems with consistent investments in frontline primary health care and community health workers.
- Mobilisation of sufficient financial resources to reduce inequalities in the ability to pay P&CHC services, and to provide financial protection against impoverishment from catastrophic health care costs.
- improved learning between health care systems and integrated care, and development of strategies for engaging the private sector

7. Capability & Capacity: the role of Education

7.1. Background

Knowledge and recognition of EPH issues are not common among physicians and other health practitioners. Physicians, in particular, FDs and FPs, should engage with environmental concerns in both their role as clinicians as well as their role as public health practitioners. EPH training of physicians should include knowledge and skills in recognising, diagnosing and treating health problems caused by ERFs. Training would include toxicology and epidemiology, both as basic science, and in the clinical training of family doctors before, during and after their specialist training. Education and training of physicians as public health practitioners must include knowledge and skills in general public health, environmental public health, and citizen participation. The successful response of the health system in the Republic of Korea has been attributed to the holistic education of the physicians of that country.[25]

7.2 Proposals and perspectives

The challenge of creating a curriculum that fits a diversity of specialities and levels of training, and covers both the science and implementation of EPH is not straightforward. It is however, important to pursuing exactly that.[52] The overall organisation of this curriculum can be based on an accredited system, according to the different levels and educational needs. It will need to consider flexibly different models of programmes, training, and capacity provisions. It will need to be promoted at the highest level of Medical Schools and Universities, as well as in community health training (see Section 6.1). Universities will need to collaborate with municipal and regional institutions for community health, in identifying standards for required training, at under-graduate and post-graduate levels, in both clinical and community or public health aspects of environmental health. The integration of academic and practical experience is crucial in the success of training in the environmental aspects of clinical medicine, and of environmental public health at the

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3 community level. Education must be inclusive, flexible, ongoing, and reflective of changes in
4 societal needs.
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7 COVID-19 illustrates very well how the principle of capacity building founded on modification of
8 tasks for P&CHC staff already in post, as we advocate in Section 6.1, may be relevant to
9 deployment of existing staff to work on any public health topic. During the COVID emergency,
10 education of all health care staff was effective because most of them were already in post. Staff
11 re-deployment to COVID-19 duties was usually accepted without modification of contracts and job
12 descriptions, in view of the acceptance of an obvious emergency. A brief statement requiring tasks
13 to be provided on public health, and in particular, EPH should be included in a contract and job
14 description, to support and facilitate effective delivery of such tasks by PHC staff.
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20 **8. Conclusions and recommendations**

21 There are multiple connections between the environment and health. There is an urgent need for
22 environmental public health policies with an intersectoral and global perspective.
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25 There is a close relationship between planetary fragility, social frailty and poverty; social justice
26 and environmental justice are two sides of the same coin.
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29 The crucial challenge is to move towards a system that is economically viable, ecologically
30 sustainable and socially fair.[53]
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33 In the past, the P&CHC was based on the relationship between doctor and patient. Today the
34 community dimension of the covid-19 crisis with its non-communicable disease and social aspects,
35 provides a lesson for any pervasive crisis.[33] The influence of the environment on health and
36 wellbeing in their acute and chronic manifestations, and the need to act at the community level
37 are increasingly evident.
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40 Because of they are embedded in and closely connected to local communities, primary and
41 community care needs to be strengthened to play a more important role in the relation between
42 individual health and the environment. Global issues need to tangibly translate to local awareness
43 in determining local health care policies as well as pandemic and other responses, including the
44 provision of essential data and information about local health. More than anyone else in the
45 health care system, P&CHC services are the ones that can make the link between people's health
46 and the environment they live in.
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On the importance of primary and community health care in relation to global health and environmental threats: lessons from the COVID-19 crisis

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4. Key words: Community health, Public Health, Primary Health Care, global environmental health, sentinel doctors for the environment, global climate change,

5. List of Abbreviation

- **CC:** Climate Changes
- **COVID-19:** Coronavirus Disease 2019
- **EPH:** environmental public health, which focuses on primary prevention and protection ~~tecting groups of people of population groups~~ from environmental threats to their health and safety ~~posed by their environments.~~
- **ERFs:** environmental risk factors
- **FDs:** family doctors
- **FPs:** family paediatricians
- **HEAL:** Health and Environment Alliance
- **HICs:** High Income Countries
- **ISDE:** International Society of Doctors for the Environment
- **LMICs:** low and -middle income countries
- **NCDs:** non-communicable diseases
- **OECD:** Organisation for Economic Co-operation and Development
- **OH:** occupational health
- **P&CHC:** primary and community health care; Primary health care¹ in view of a Community health² perspective
- **PHC:** primary health care¹
- **SARS-CoV-2:** Severe Acute Respiratory Syndrome coronavirus 2
- **WHO:** The World Health Organisation
- **WONCA-ENV:** World Organization of Family Doctors, (WONCA Working Party: Environment)

¹ Primary health care is a whole-of-society approach to health and well-being centred on the needs and preferences of individuals, families and communities. -It addresses the broader determinants of health and focuses on the comprehensive and interrelated aspects of physical, mental and social health and wellbeing. It provides whole-person care for health needs throughout the lifespan, not just for a set of specific diseases. Primary health care ensures people receive comprehensive care - ranging from promotion and prevention to treatment, rehabilitation and palliative care - as close as feasible to people's everyday environment: (WHO, [2019](#))

² environmental, social, and economic resources to sustain emotional and physical wellbeing among people in ways that advance their aspirations and satisfy their needs in their unique environment (WHO, [1998](#))

Title:

On the importance of primary and community health care in relation to global health and environmental threats: lessons from the COVID-19 crisis

Abstract

In the course of the COVID-19 pandemic, it has become clear that primary healthcare systems play a critical role in clinical care, such as patient screening, triage, physical and psychological support, and also in promoting good community advice and awareness in coordination with secondary health care and preventive care. Because of the role of social and environmental factors in COVID-19 transmission and burden of disease, it is essential to ensure that there is adequate co-ordination of population-based health services and public health interventions.

The COVID-19 pandemic has shown the weaknesses of the primary and community health care (P&CHC) system worldwide. In many instances P&CHC played only a minor role, the emphasis being on hospital and intensive care beds. This was compounded by political failures in supporting local community resilience.

Placing community building, social cohesion, and resilience at the forefront of dealing with the COVID-19 crisis can help align solutions that provide a vision of “planetary health”. This can be achieved by involving local well-being and participation in the face of any pervasive health and environmental crisis, including other epidemics and large-scale ecological crises.

This paper proposes that P&CHC should take ~~up~~ on two critical roles: first, to support local problem-solving efforts and to serve as a partner in innovative approaches to safeguarding community well-being; and second, to understanding local environment and health ~~health~~ risks in context of the global health perspective.

We see this as an opportunity of immediate value and broad consequence beyond the control of the COVID-19 pandemic.

Summary Box

- In 1978, the Alma Ata (Kazakhstan) declaration asserted the strategic importance of high-quality primary health care in the creation of effective and responsive health care systems. Unfortunately, 42 years later, this vision has not been attained yet.
- In October 2018, health experts and policymakers met in Astana (Kazakhstan) to renew the commitment for comprehensive available health care to all, reaffirming the commitments to the Alma-Ata core principles.
- The lack of involvement of the primary and community health care (P&CHC) systems during the COVID-19 pandemic has highlighted their crucial role in clinical and public health functions such as diagnosis (screening), triage, contact tracing, and in the short and long-term physical and psychological monitoring and management of patients. The current

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3 emergency has also shown the need for P&CHC to work in coordination with other health
4 care and public health organisations at the community level.
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- There is an urgent need for environmental public health policies with an intersectoral and global perspective acknowledging the influence of the environment and the need to act at the community level. Besides the traditional focus on the individual, it is essential that public health agencies encourage and promote the involvement of P&CHC within the framework of community and environmental health. The value of this has been highlighted by the response to COVID-19, but it is equally central to the management of other crises affecting communities.

Confidential: For Review Only

1. Introduction and objectives

The novel Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) and its resultant COVID-19 disease is the most challenging health emergency faced by humanity in living memory. This pandemic represents a grave threat to global health, economy and the social well-being of people.

The COVID-19 pandemic has emphasised the crucial role that primary and community healthcare (P&CHC) systems [1,2] could play in diagnosis or screening and triage, as well as in the short and long-term monitoring of the physical and psychological conditions of those affected. The current emergency has also highlighted the need for P&CHC to work on tracing and management of contacts in coordination with other health care organisations such as local and national public health institutions, [3,4], as well as those at the community level [5] such as community-based civil society groups and community health workers.

Because of the role of social and environmental factors in COVID-19 transmission and in the burden of disease, it is essential to ensure that population-based health services and interventions are adequately prioritised and coordinated between P&CHC providers, and public health organisations.

There are recognisable dimensions to the complex domain of how decisions are made to manage rapidly emerging problems. Each approach to crisis management has its merits, and they are all interconnected. [6] The role of P&CHC is central to the effective management of any health crisis.

Despite historical and ongoing discrepancies between and within the policy and scientific communities, (mainly due to the complexity mentioned above), the pandemic has shown the importance of facilitating the interrelationship and mutual support between the health, social, environmental, and political-economic domains.

The goal of this article is to highlight the crucial role that P&CHC could play in managing the COVID-19 pandemic, in addressing key environmental and social aspects involved in viral transmission, and assist in the design of the interventions to control it. The article discusses how the success of such interventions depends on an overall vision of integrating environmental health with social and health care. It makes the case that enhancing such capacity now will have a more comprehensive benefit for better addressing this crisis and others in the future.

We lay emphasis on the importance of a multidisciplinary and effective workforce in environmental public health (EPH), [7] in collaboration with P&CHC, and hospitals.

The COVID-19 pandemic is not the only concern we address with this proposed strategy; this is an exemplar of a “stress test” of global [health and](#) environmental [and health](#) threats.

2. SARS-CoV-2 and COVID-19: an example of environmental and socio-political imbalance

The origin of SARS CoV-2 and the subsequent COVID-19 pandemic, have revealed the precariousness of the systems upon which trade, food, energy, transportation, and social safety and security nets depend.

The reported origin of the current pandemic emphasises the exceptional relationship that exists between the environment, animal and human health (One-Health approach).^[8] Recent evidence suggests that SARS CoV-2 emerged from transportation and trading of wild animals in wet markets.^[9] About one billion cases of illness and millions of deaths occur every year from zoonoses, which comprise about 60% of all emerging infectious diseases globally.^[10] The majority (60.3%) of these (60.3%) are caused by zoonotic pathogens, out of which 72% have a wildlife origin.^[11] Ecosystem health, wildlife health and human health are increasingly interconnected, and there is leading to an urgent need to develop locally and globally coordinated plan-plans for better addressing the impacts of environmental change on zoonotic and parasitic infections.^[12] including COVID-19.^[13]

Local, national, large scale and systemic environmental changes and disruptions, such as biodiversity loss, disruption of natural habitats, extinction of species, climate change, pollution, together with societal and demographic changes (e.g. urbanisation, increase in mobility, population aging) are likely determinants of different epidemics.^[14] Both environmental and social factors play an important role by facilitating the occurrence of new or re-emerging infectious diseases, and/or by greatly modulating their health impacts.

3. Global/Local, two sides of the same coin

The way in which the COVID-19 crisis developed in time and space made clear that the distinction between local and global has largely become superficial largely unimportant.^[15] The local ecological wild life and human interactions in Wuhan (China), have been recognised as the origin of the SARS-COV-2 spillover, which afterwards quickly spread across the globe. Such globalisation of ostensibly local incidents are not detached from related to global environmental issues such as ecological erosion and the climate crisis. Within a global political and economic order that promotes unsustainable practices, regional and local political and economic decisions lead to causing deforestations, intensive farming, unsustainable energy production, air pollution, deterioration of water and soil, all of which contribute further to the global ecological and climate crisis, increasing the likelihood of emerging global impacts in the future. ^[16]

~~This occurs in the context of a global political economic order which promotes unsustainable practices. And while global system level change is needed, individuals and communities can also play an important role in helping to address environmental problems at multiple levels.~~

~~The role of a globalised economic order that prioritises short-term profits of private interests, often benefitting actors in wealthy countries, and elites in low and middle-income countries~~

(LMICs), while dismissing environmental and social fallout as ‘negative externalities’, are clearly recognised.

There are many historical examples of how societies did not recognise the “circularity in nature” with disastrous results. Such lessons have shown how big businesses affect the environment, and what individuals and communities can do about our environmental problems today.[16]

P&CHC can contribute to addressing such global challenges, with the view of prevention and protection ~~of from~~ harm ~~to of~~ communities, with global benefits ~~by~~ sharing of experiences and expertise to improve competencies and capabilities at the local level.

These efforts are not at all simple to deploy for many reasons such as the overall organisation or conflicts between science and politics.[17-19]

~~Other determinants that can affect t~~The uneven distribution of COVID-19 cases and severity of the disease, [20], ~~are determined by and therefore need to be considered, are: the~~ socioeconomic circumstances, inequality associated with poor working and living conditions, ~~the~~ access to services, ~~and~~ mobility, and pre-existing health conditions associated with deprivation.[21]

Populations lacking access to health services in normal circumstances are left most vulnerable during times of crisis, [22], and addressing such social determinants and inequities is part of the challenge of P&CHC at global level and first and foremost at local level.

4. Primary and Community Health Care as a cornerstone to address ~~the~~ global concern issues at the local level

P&CHC ~~was important~~ has historically had a crucial role in communities dealing with global challenges globally, even before the current pandemic. Societies are ageing, obesity, non communicable diseases and reemerging infectious diseases with health spending is rising, [23]. ~~and~~ it is therefore, imperative to redesign health systems that contribute to community health by addressing environmental factors. The rapid spread of COVID-19 added complexity to these challenges. A multidisciplinary P&CHC workforce can play a vital role in recognition and management of environmental and social factors of community health. ~~Family doctors (FDs) and family paediatricians (FPs) mainly in high income countries (HICs), are usually the first contact point for patients, even in the current pandemic. Family doctors (FDs) and family paediatricians (FPs) are usually the first contact point for patients, even in the current pandemic, especially in high-income countries (see Section 6.3 for considerations more specific to LMICs).~~

4.1. Health impacts in different settings of Primary and Community Health Care approach

The main critical threat of the COVID-19 pandemic was likely due to the ~~the potential~~ collapse of the health service, which has. ~~This has~~ been extensively investigated worldwide ~~to learn lessons~~. [24, 25] The Italian experience is an example.

1
2
3 Italy was the first European country involved in the pandemic and has been one of the worst
4 affected. The first confirmed cases were detected on January 31/1st,/2020, followed by the
5 identification of a ~~Later a~~ cluster of cases with the first deaths ~~was identified~~ in a Northern region
6 ~~of (Lombardy)~~. The virus had spread to the neighbouring region of Veneto, but ~~not~~ initially not
7 to other areas of the country.
8
9

10
11 The Italian health care system is highly decentralised; different regions implemented different
12 policy responses to COVID-19. The most notable example is the contrast between the approaches
13 adopted by Lombardy and Veneto, two neighbouring regions with similar socioeconomic profiles.
14
15

16 Lombardy, one of Europe's wealthiest and most industrial productive areas, was
17 disproportionately hit by COVID-19. Veneto, which is similarly wealthy, by contrast, fared
18 significantly better. ~~Also at the geinning In the of the second wave of the pandemic in Autumns,~~
19 Lombardy has been scored at the highest level of risk [26]. The decision made by the Italian
20 Ministry of Health [25] based on 21 objective criteria shows that such a different level of risk in
21 these two regions has substantially been confirmed also with the 2nd wave of COVID-19 pandemic
22 in Italy. In fact, Lombardy was one of the most affected regions in Italy, whilst Veneto was one of
23 the least affected ones. Admittendly, at present (December 28th, 2020), the situation is
24 changing slightly, arguably linked to many contributing factors conditions (virological,
25 organisational), which are under investigation.
26
27
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29

30
31 The spread of COVID-19 and the policy measures taken in these two regions were shaped by a
32 multitude of factors, including the different public health management choices applied in each
33 region.[27]. ~~It is interesting to note that regions with interventions based mainly on hospital~~
34 ~~activities, such as Lombardy [27], showed much larger case fatality rates, compared to regions~~
35 ~~such as in Veneto, where Family Doctors were primarily involved. Interventions in Lombardy – like~~
36 ~~in other regions which experienced much larger case fatality rates – were based mainly on hospital~~
37 ~~activities.-[28]. The region of whereas Veneto, -at least in the first half of the year 2020, relied~~
38 ~~more on the involvement of primary care doctors, with resulting -had much lower health impacts.~~
39 While the situation is more complex with many factors (such as socioeconomic, organisational,
40 infrastructure, public health surveillance) contributing to the observed differences in health
41 impacts, this experience highlighted the importance of P&CHC as the frontline in dealing with
42 health crises.
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49 4.2 Connections of Primary and Community Health Care

50
51 The connection between P&CHC and occupational health (OH) is well established. This is
52 important for better prevention of chronic conditions (such as musculoskeletal or mental health
53 disorders) that lead to absenteeism or early departure from the labour force [29]. Efforts to
54 improve workers' physical and mental health include raising awareness among managers,
55 improving the physical working environment, humanising social relations at work, and offering
56 programmes dedicated to encouraging disabled people to return to work. Equally important is the
57 health surveillance of workers especially for physical, chemical, or biological hazards at work.
58
59
60

In this respect, COVID-19 presents an almost unique instance where occupational and environmental risks factors have overlapped, generating a health, social and economic impact of a magnitude not seen before. Failure of OH control at work will affect many individuals; failure of control in the community will result in many sick workers. Hence the close coordination between P&CHC, OH, EPH and enforcement authorities is essential.[30]

P&CHC can play two critical roles: one, as partners to public health policymakers and agencies in contributing to monitoring impacts and serving as an "anchor institutions"[31] for implementing local solutions and innovative approaches to safeguarding community health; and two, an essential role in community building, social cohesion, and resilience.[32]

5. Primary and Community Health Care: the linchpin connecting environment and health

~~Current evidence shows that COVID-19 fatalities were highest among people made vulnerable by less favourable structural social conditions. A disproportional number of those with COVID-19 and severity of the disease are related to deprived or crowded living and working conditions, poverty, access to services and mobility, and pre-existing health conditions associated with deprivation.[32] Populations lacking access to health services are most vulnerable during times of crisis.[33]~~

COVID-19 severity and fatality has been shown highest amongst those made vulnerable by less favourable structural social conditions [22]. The unequal distribution of health and mortality burden disfavouring those most vulnerable between and within countries and communities, shows similarities across the spectrum of health conditions – these being communicable or non-communicable. [33, 34]

In the case of COVID-19 the term “syndemic” has been cited as the health burden has been beyond the number of cases of infection, and has extended to several non-communicable disease (NCD) aspects.[35] First, biological and social interactions of COVID-19 with underlying non-communicable health conditions often lead to more serious, including lethal, disease progression. Second, -services for NCD have been considerably disrupted in three quarters of countries globally [36] with associated impacts. As environmental factors are estimated to account for at least 25% of the preventable burden of disease, including NCDs [36], a perspective for primary prevention of community disease burden cannot ignore environmental public health.

The health effects associated with environmental risk factors (ERFs), usually quantified through mortality, emergency visits and hospitalisations are underrepresented, as many illnesses treated by FDs or FP are missed in these numbers.[37] For example, vector-borne infectious diseases show a ~~robust~~ geographical heterogeneity linked to CC climate change crisis (CC). [38] In these cases, global strategies addressing ~~such as CC climate crisis can and~~ should be implemented locally. ~~As such, t~~The role of local community-based FDs and FPs is essential. ~~There is much that FDs and FPs in what they~~ can do to encourage mitigation of CC, and to assist communities in their adaptation efforts. A clear and comprehensive example of the activities which could be carried out

within the P&CHC framework to address global ~~ERFs~~ environmental risk factors is provided in ~~by~~ by TAB. 1 Table 1. [40]

Table 1. P&CHC role in relation to global health threats

- **Public education and raising e-of awareness**
- **Day-by-day involvement in local/regional/national strategies to tackle antimicrobial resistance within a One-health approach**
- **Early alert systems: impending weather extremes, infectious disease outbreaks**
- **Disaster preparedness, including increasing the health system's 'surge' capacity to respond to emergencies**
- **Enhanced infectious disease control programmes**
 - food safety, vaccine programs, case detection and treatment
- **Improved surveillance**
 - vector control
 - risk indicators (e.g., aeroallergen concentration)
 - health outcomes (e.g. infectious diseases outbreaks, rural suicides, seasonal asthma peaks)
- **Appropriate health workforce training, including continuing professional development (e.g. updated understanding of climatic influences on health, training in public health)**

Source: Blashki et al. 2007 [41] adapted.

6. How should this be done? Implementing stronger primary and community health care

~~New approaches should be implemented as preventive health/care measures, aiming at a broad, integrated perspective. New approaches should can be implemented as preventive health/care measures, with a broad integrated perspective. Action is needed at multiple levels, and -which is attuned to different contexts.~~

6.1. Local-national level

A policy survey conducted by the Organisation for Economic Co-operation and Development (OECD) [1] suggests that key policies and strategies delivering better P&CHC should be based on:

- **New models of care:** rather than the single-practice physician, Multidisciplinary health teams, supported by digital technology should be pro-actively engaged in preventive care. [3940]
- **More economic incentives:** to encourage P&CHC to work in teams and focus on prevention and continuity of care.
- **A broader role for patients,** including involving the patients in the co-management of their health.

Digitalisation is essential to integrate P&CHC further at the community level. "Precision public health" is an approach which uses data from traditional and emerging sources, for example big-data to target interventions for populations by person, place, and time. [42] With such ~~an~~

approach, supported by ~~a~~ strong empirical foundations, electronic health records from P&CHC, especially if in combination with data on environmental circumstances represent an essential source of data and understanding at the local level.[43]

As such, FDs and FPs could play a crucial role in connecting global concerns with local actions through the information they provide, ~~and their influence on attitude which can build evidence base needed and last and but not least on~~ policy, in addition to their important role in community awareness and attitudes. [44]

EPH at the level of primary health care could be strengthened ~~by an~~ through agreements with:

1. **Employers of primary care staff (usually in the public sector)**, to modify contracts and job descriptions of selected currently employed P&CHC staff to identify tasks related to environmental public health aspects of community health.
2. **Universities and other agencies required for provision of training** of P&CHC staff, to identify appropriate competencies and standards required, and develop related training programmes to enable them to perform the tasks as in (1). It is possible that a first cohort of P&CHC staff may not have acquired sufficient training in environmental public health in the absence of formally recognised training programmes, so this aspect will concern successive cohorts; furthermore, life-long-life learning would drive towards a larger number.
3. **Professional registration bodies**, such as Ordine dei Medici/General Medical Council and other professional registration authorities, depending on country and type of profession [45], to conduct and conclude negotiations with employers and universities/training agencies for skills and competencies required to achieve registration of staff who have completed training as in (2) as part of their professional qualification.
4. **Health agencies** to promote secondary use of electronic health records data from primary and community care facilities and linking that to other data relating to the environment.

6.2. International level

International organisations should provide a logical framework where the crucial role of P&CHC in EPH is emphasised especially ~~in with~~ respect of to data sharing, responsibilities, capability and consistent capacity building. The following organisations are already dealing with such issues, and “should” be encouraged to develop such framework with a collaborative perspective.

The World Health Organisation (WHO) stated that a vision for PHC in the 21st century must be based on individuals and communities as a unique focus.[46]

WONCA (World Organization of Family Doctors) is an international organisation that aims at improving the quality of life by fostering high standards of care in general practice/family medicine considering the environment.[47]

1
2
3 **Health and Environment Alliance (HEAL)** is the leading European not-for-profit organisation
4 addressing how the natural and built environments affect health in Europe.[48]
5

6
7 **International Society of Doctors for the Environment (ISDE)** was founded 30 years ago, aiming at
8 educating physicians and the general public.[49]
9

10 **6.3. Low and Middle Income Countries**

11 Particular attention must be paid to LMICs with populations and economies more vulnerable to
12 the immediate effects of ~~climate change~~ CC and zoonotic-parasitic infection, and the longer-term
13 health, social and economic impacts of the current pandemic, and more generally to the
14 difficulties towards a sustainable and equitable development.
15
16

17
18 Integration of PHC in view of a community health perspective in LMICs is complex. As such, two
19 points [1] should be raised:
20

- 21
22 1. **Data:** Many LMICs lack sufficient data on PHC performance; with some countries lacking
23 even basic vital registration data.[50]
24

25
26 Data gaps that influence PHC systems can be found at any level and dimension of the
27 health system, including aspects of governance, leadership, and population health
28 management.
29

- 30
31 2. **Integration:** Integrating a PHC system is a combined effort, and there is no single tool to
32 achieve this. The PHC systems design approach must be strengthened, incorporating
33 human resources for health, financing, facilities, private sector, and demand to develop
34 and enhance integrated systems.
35
36

37 PHC is mainly based on the awareness of the socioeconomic, capacity and cultural/historical
38 features in which the FDs work. As such, according to the Astana declaration [50], a holistic
39 approach to integrating ~~it with~~ must integrate t with efforts to deal with other primary conditions such
40 as malnutrition, waterborne diseases, and infectious diseases which disproportionately impact
41 LMICs.
42
43

44
45 According to OECD [1], in LMICs' attention needs to be directed to:
46

- 47
48 • district management systems with consistent investments in frontline primary health care
49 and community health workers.
50
- 51
52 • Mobilisation e of sufficient financial resources to reduce inequalities in the ability to pay
53 P&CHC services, and to provide financial protection against impoverishment from
54 catastrophic health care costs.
55
- 56
57 • improved learning between health care systems and integrated care, and development of
58 developing strategies for engaging the private sector
59
60

7. Capability & Capacity: the role of Education

7.1. Background

Knowledge and recognition of EPH issues are not common among physicians and other health practitioners. Physicians, in particular, FDs and FPs, should engage with environmental concerns in both their role as clinicians as well as their role as public health practitioners. EPH training of physicians should include knowledge and skills in recognising, diagnosing and treating health problems caused by ERFs. Training would include toxicology and epidemiology, both as basic science, and in the clinical training of family doctors before, during and after their specialist training. Education and training of physicians as public health practitioners must include knowledge and skills in general public health, environmental public health, and citizen participation. The successful response of the health system in the Republic of Korea has been attributed to the holistic education of the physicians of that country.[24]

7.2 Proposals and perspectives

~~First, it is essential to note that t~~The challenge of creating a curriculum that fits a diversity of specialities and levels of training, and covers both the science and implementation of EPH ~~is not straightforward. It is however, important will be difficult. However, it is also imperative to to be strongly focused on~~ pursuing exactly that.[52] The overall organisation of this curriculum ~~should can~~ be based on an accredited system, according to the different levels and educational needs. It will need to consider flexibly different models of programmes, ~~/~~training, ~~and~~ ~~/~~capacity provisions. It will need to be promoted at the highest level of Medical Schools and Universities, as well as in community health training (see Section 6.1). Universities will need to collaborate with municipal and regional institutions for community health, in identifying standards for required training, at under-graduate and post-graduate levels, in both clinical and community or public health aspects of environmental health. The integration of academic and practical experience is crucial in the success of training in the environmental aspects of clinical medicine, and of environmental public health at the community level.

Education must be inclusive, flexible, ongoing, and reflective of changes in societal needs.

COVID-19 illustrates very well how the principle of capacity building founded on modification of tasks for P&CHC staff already in post, as we advocate in Section 6.1, may be relevant to deployment of existing staff to work on any public health topic. During the COVID emergency, education of all health care staff was effective because most of them were already in post. Staff re-deployment to COVID-19 duties was usually accepted without modification of contracts and job descriptions, in view of the acceptance of ~~an obvious emergency~~. A brief statement requiring tasks to be provided on public health, and in particular, EPH should be included in a contract and job description, to support and facilitate effective delivery of such tasks by PHC staff. ~~This is due to the less obvious features of environmental factors as emergencies, compared to COVID.~~

8. Conclusions and recommendations

There are multiple connections between the environment and health. There is an urgent need for environmental public health policies with an intersectoral and global perspective.

There is a close relationship between planetary fragility, social frailty and poverty; social justice and environmental justice are two sides of the same coin.

The crucial challenge is to move towards a system that is economically viable, ecologically sustainable and socially fair.[53]

In the past, the P&CHC was based on the relationship between doctor and patient. Today the community dimension of the covid-19 crisis with its non-communicable disease and social aspects, provides a lesson for any pervasive crisis.[34] The influence of the environment on health and wellbeing in their acute and chronic manifestations, and the need to act at the community level are increasingly evident.

Because of they are embedded in and closely connected to local communities-, primary and community care needs to be strengthened to play a more important role in the relation between individual health and the environment. Global issues need to tangibly translate to local awareness in determining local health care policies as well as pandemic and other responses, including the provision of essential data and information about local health. More than anyone else in the health care system, P&CHC services are the ones that can make the link between people's health and the environment they live in.

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