QUESTÃO Nº 1

Diversity, creativity, and flexibility will be needed from the next generation of medical scientists

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There are interesting times ahead of us. Medical sciences are at the forefront of efforts to solve some of the biggest problems facing our society, including our ageing population, global poverty and health inequalities, and the impacts of climate change and antibiotic resistance. We live in an era in which advances in genetics and our increasing capacity in data and computing are rapidly changing the way we understand and treat disease. Yet political upheaval and its associated uncertainty, a so-called post-truth society, increasing competition for funding, and the potential closing of borders pose a real threat to our progress.

If we are going to solve the problems facing us, more than ever we will need to attract and retain the brightest and best minds. Looking at the Abstracts from our Spring Meeting gathered here, the extremely high calibre of the next generation of clinician scientists is clear to see.

Medical scientists of the future will need to be dynamic, creative, and forward thinking to deal with the complex challenges they face. More than ever they will need to participate in multidisplinary teams, engage in team science, and will need to develop leadership skills to anticipate change, navigate their career pathway, and influence those around them.

To achieve all of this in an increasingly competitive landscape, there will be a temptation to work longer and longer hours to the exclusion of other interests. However, it is my own view, and that of the Academy of Medical Sciences, that this would be a short-sighted approach. Time outside of work has the potential to nourish creativity, build resilience, and give fresh perspective—precisely the skills that result in the best quality research.

So this year we are celebrating the importance of finding the right blend of outside interests alongside a career path in medical science in a new project called MedSciLife. The project is being launched at our Spring Meeting and in this special issue of *The Lancet*.

MedSciLife is an attempt to show the richness and diversity of working styles within our community and, perhaps most importantly, demonstrate that there is a life outside medical science. This is not an added extra—it is integral to who we are and the skills we must develop to be successful. The project is also an effort to show that medical scientists are not a homogeneous community, we are people from many different backgrounds living very different lives. Shining a spotlight on the person behind the labcoat or stethoscope, which is one of the key aims of MedSciLife, will help to

promote better working practices and should help to inspire the medical scientists of the future.

In this spirit, I wanted to share key components of my own MedSciLife. My family is the most prominent feature of my life outside work. I have five children, the youngest is 17 and will be heading off to university next year. My second eldest son has made me a grandfather twice, my grandsons are 2·5 years and 6 months old and live in Manchester. I don't get to see them as often as I would like, but we chat online.

At school my best subjects were the arts; I chose science over arts simply because I wanted to study medicine, but humanities and arts remain an essential part of me, and my life is enriched when I am able to indulge in them. I am a closet artist, and love to sketch when I have time. Staying in one place for hours at a time while looking intently at something I want to capture is a form of therapy and is often when I find the solutions to challenges in my work life.

Nourishing and enriching my life outside of science has been essential to my career. When my life risks becoming dominated by work I feel quite unhealthy. Stepping out of my scientific world becomes necessary, and for me travel can be a refuge. My wife is Italian and Umbria is a special place for us where we can unwind and take things at a different pace. When travel isn't possible, spending time with my family or appreciating fantastic art helps to restore my perspective and sense of humour—both of which are essential to weather the highs and lows of a career in medical science.

I hope that MedSciLife will help those at all stages of their career to embrace the philosophy of celebrating different ways to blend life and work—giving us the chance to be the best we can now, and pave the way for an even better future

QUESTÕES (responda em português)

1. **De acordo com o texto, as ciências médicas estão na vanguarda em questões relacionadas a grande problemas da atualidade, tais como envelhecimento da população, mudanças climáticas e resistência bacteriana. Do mesmo modo, quais são contextos atuais que têm dificultado a realização de pesquisas neste campo da ciência? (1,5)**
   (Linhas 13 a 15) Agitação política e a incerteza associada, a chamada "sociedade pós-verdade", o aumento da concorrência pelo financiamento, e o potencial fechamento das fronteiras.

2. **O autor releva seu "MedSciLife". Do que foi elencando no texto, o que você consideraria como factível em sua vida de pós-graduando? O que seria um desafio? (1,5)**
   (Linhas 48,49, 50, 58, 66, 67) O candidato deverá identificar pelo menos dois dos seguintes itens:

   - Ficar com família o máximo possível e quando não for, utilizar chat por internet

- Ficar em um lugar por horas observando ou capturando informações

- Aproximar-se das artes

- Viajar com a família

QUESTÃO Nº 2

Microcephaly epidemic related to the Zika virus and living conditions in Recife, Northeast Brazil

Souza WV, Albuquerque MFPM, Vazquez E, Bezerra LCA, Mendes ADCG, Lyra TM, Araujo TVB, Oliveira ALS, Braga MC, Ximenes RAA, Miranda-Filho DB, Cabral Silva APS, Rodrigues L, Martelli CMT.

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Background: Starting in August 2015, there was an increase in the number of cases of neonatal microcephaly in Northeast Brazil. These findings were identified as being an epidemic of microcephaly related to Zika virus (ZIKV) infection. The present study aims to analyse the spatial distribution of microcephaly cases in Recife (2015–2016), which is in Northeast Brazil, and its association with the living conditions in this city.

Methods: This was an ecological study that used data from reported cases of microcephaly from the State Health Department of Pernambuco (August 2015 to July 2016). The basic spatial unit of analysis was the 94 districts of Recife. The case definition of microcephaly was: neonates with a head circumference of less than the cut-off point of −2 standard deviations below the mean value from the established Fenton growth curve. As an indicator of the living conditions of the 94 districts, the percentage of heads of households with an income of less than twice the minimum wage was calculated. The districts were classified into four homogeneous strata using the K-means clustering algorithm. We plotted the locations of each microcephaly case over a layer of living conditions.

Results: During the study period, 347 microcephaly cases were reported, of which 142 (40.9%) fulfilled the definition of a microcephaly case. Stratification of the 94 districts resulted in the identification of four strata. The highest stratum in relation to the living conditions presented the lowest prevalence rate of microcephaly, and the overall difference between this rate and the rates of the other strata was statistically significant. The results of the Kruskal-Wallis test demonstrated that there was a strong association between a higher prevalence of microcephaly and poor living conditions. After the first 6 months of the study period, there were no microcephaly cases recorded within the population living in the richest socio-economic strata.

Conclusion: This study showed that those residing in areas with precarious living conditions had a higher prevalence of microcephaly compared with populations with better living conditions.

Keywords: Zika, Ecological study, Socio-economic, Brazil

QUESTÕES (responda em português)

1. **Qual o objetivo do estudo? (1,0)**

(linhas 106 a 108) Analisar a distribuição espacial dos casos de microcefalia em Recife (2015-2016) e suas associações com as condições de vida nesta cidade.

2. **Como um caso de microcefalia foi definido? (1,0)**

(Linhas 111-114) recém-nascidos (ou neonatos) com a circunferência cefálica (da cabeça, do crânio) menor que o ponto de corte de 2 desvio-padrão menor que a média estabelecida na curva de crescimento de Fenton.

3. Baseado nessa definição quantos casos ocorreram no local e período do estudo? (0,5)

(Linha 119) 142 casos

4. Como os autores estratificaram as 4 categorias de "condições de vida"? (0,5)

(linhas 116-117). Pelo algoritmo de agrupamento K-médias

5. Qual a conclusão do estudo? (1,0)

(linhas 128-130). Aqueles residindo em áreas com condições de vida precárias tinham um maior prevalência de microcefalia comparados com populações com melhor condições de vida.

QUESTÃO Nº 3

HIV/AIDS, tuberculosis, and tobacco in Brazil: a syndemic that calls for integrated interventions

Novotny Thomas, Hendrickson Erik, Soares Elizabeth C. C., Sereno Andrea B., Kiene Susan M.. HIV/AIDS, tuberculosis, and tobacco in Brazil: a syndemic that calls for integrated interventions. Cad. Saúde Pública [Internet]. 2017 [cited 2018 Feb 02] ; 33(Suppl 3): e00124215.

HIV/AIDS, tuberculosis (TB), and tobacco use are three important global health challenges. These epidemics act independently but also collectively, amplifying the health impacts of each. This synergism of diseases is termed “syndemic”. These three epidemics are usually approached through separate programs led by infectologists, pulmonologists, and behavioralists, respectively. The social determinants of disease, including poverty, low-education, high population-density, and cultural norms, are common to all three. The syndemic also challenges health systems and suggests that a systems-based approach may improve disease outcomes as well as practices.

There is evidence supporting linkages between HIV/AIDS, TB, and tobacco use. TB disease, mortality, and recurrent TB are associated with smoking. Smoking increases risk for latent TB infection (LTBI), progression to active disease, delayed sputum conversion, default from treatment, relapse, and drug resistance. Second-hand smoke may also increase risk of TB within households.

TB is the most important opportunistic infection for persons living with HIV/AIDS. HIV/AIDS is a risk factor for poor TB treatment outcomes and higher TB mortality. Persons living with TB have 1.6 times greater risk of progressing to AIDS and were 2 times more likely to die compared with TB negatives. TB also increases HIV replication due to activation of latent virus in macrophages and T-lymphocytes and is associated with reduced CD4+ counts. In a Danish cohort, more than 60% of HIV/AIDS deaths were associated with smoking. Smoking among Persons living with HIV/AIDS increases risks for pneumonia as well as for oropharyngeal diseases. Smoking also increases risks for cardiovascular disease, dyslipidemia, insulin resistance, and chronic lung disease among persons living with HIV/AIDS. Nicotine has modulating effects on immune systems.

Three intersecting epidemics in Brazil

HIV/AIDS, TB, and tobacco are significant health challenges for Brazil, together accounting for 150,000 annual deaths. In 2013, there were 93,000 new TB and 760,000 new HIV cases, with 13,000 co-infected. Expanded HIV diagnosis among TB patients is a priority in Brazil, and in 2013, 70% knew their HIV status compared with 31% in 2003.

Tobacco use is still a concern in Brazil, with 15% current adult smoking in 2013 and higher prevalence among those with lowest education (20.2%). A recent cohort study found that after controlling for socioeconomic status, smokers had 2.5 greater risk for

recurrent TB compared to non-smokers and that smokers were more likely to default on TB treatment. A 2014 Brazilian cohort study of 2,775 persons living with HIV/AIDS found 29.9% current smokers and 23.9% former smokers. Current smokers were more likely to be less educated; to use alcohol, crack, and cocaine; and to be hospitalized for co-existing conditions.

A syndemic approach

Traditional public health approaches usually involve single programs that do not address interactions of risks or diseases. A syndemic approach to HIV/AIDS and TB should integrate tobacco control in the care of patients with these conditions. At a minimum, improved overall health can be expected as a result of smoking cessation. A more comprehensive approach to the social determinants of tobacco use may also reduce combined effects of TB and HIV/AIDS.

New diagnoses of TB or HIV/AIDS are critical events for patients and could be linked to tobacco interventions. Newly diagnosed TB patients receive directly observed treatment short-course (DOTS), a patient-centered case management approach that requires regular provider contact for six months. This represents an opportunity to address tobacco use among patients and families. Similarly, patients diagnosed with HIV/AIDS and taking anti-retroviral treatment (ART) need significant clinical support to adhere to ART; they may be especially receptive to health interventions such as smoking cessation.

There have been multiple pilot studies on TB and cessation, including in Brazil, with randomized trials in Pakistan and South Africa. Brief advice and motivational interviewing were effective in reducing smoking among TB patients. A 2014 review of cessation interventions among persons living with HIV/AIDS indicated that these must take into account social context, mental health, and other risk behaviors. Multiple, varied interventions delivered consistently over time were most successful.

Conclusion

There is sufficient evidence that TB, HIV/AIDS, and tobacco use create synergistic disease burdens. Persons with TB and HIV/AIDS who use tobacco may not access health care or social supports necessary for health behavior change. They may not understand the impacts of tobacco use on their infectious diseases, and social norms may facilitate health risk behaviors. Add to this the impacts of poverty, dietary insufficiency, and crowding, and then the challenges to providing comprehensive care become clear. These factors may be best addressed using a systems-based approach.

Brazil has implemented effective TB and HIV/AIDS programs. These may be able to integrate low-cost tobacco control interventions, including cessation services, community participation, and outreach that can reduce tobacco use. To implement integrated tobacco control within TB and HIV/ AIDS programs, context-specific research and guidelines are needed. Policies that increase the price of cigarettes, reduce access to tobacco products, support smoke-free homes and workplaces,

publicize risks of tobacco use for TB and HIV/AIDS, and mandate cessation counseling in DOTS and ART programs could impact the health of affected populations. However, potential barriers and limitations include: gaining political authority to change policy with DOTS and ART programs; engaging infectologists in the relevance of tobacco control; and involving communities and families in a collective approach to tobacco use among affected patients. Nonetheless, the benefits of a syndemic approach to patients suffering from these conditions would likely far outweigh costs of implementation.

Research to test integration of tobacco control within TB and HIV/AIDS programs should involve the Family Health System in Brazil. In this system, geographically-based Family Medicine teams involving physicians, nurses, practical nurses, and agentes (community health workers) provide comprehensive care to targeted communities. These teams can integrate care for multiple diseases and address community health. Brazil has prioritized tobacco control as a national objective, with notable success in the reduction of smoking prevalence from approximately 35% among adults in 1989 to 15% in 2013. This bodes well for an integrated approach to tobacco use among populations affected by TB and HIV/AIDS. However, these populations will need more than simple behavioral therapy to become smoke-free (Figure 1).

Figure 1

Recommendations: addressing the tuberculosis (TB), HIV/AIDS, and tobacco syndemic in Brazil.

1. Implementation research is needed to address the syndemic of HIV/AIDS, TB, and tobacco use in Brazil. Such research must take into account the common social determinants of these conditions.

2. Behavioral interventions alone are insufficient to reduce smoking prevalence among poor, marginalized, and highly vulnerable populations affected by TB and HIV/AIDS. Comprehensive, policy-based approaches must be implemented in order to reinforce clinical behavioral interventions as well.

3. Brazil's primary care-based health system and established tobacco control efforts provide an appropriate setting to test interventions among highly-vulnerable populations affected by the HIV/AIDS, TB, and tobacco syndemic.

QUESTÕES (responda em Português)

1- Explique o conceito de "***Sindemia***" de acordo com o autor (0,5)

Sindemia é o sinergismo de doenças, nesse caso as três epidemias agem de forma independente, mas também coletivamente, ampliando os impactos sobre a saúde de cada uma.

2- Segundo o autor quais são as barreiras, limitações e recomendações para o enfrentamento integrado dessas três doenças? (1,0)

As barreiras e limitações potenciais incluem: alcançar gestores públicos para mudar a política dos programas de tratamento supervisionado de Tuberculose e de acompanhamento da Terapia antiretroviral em pessoas vivendo com HIV/AIDS; envolvimento de infectologistas no controle do tabagismo; e envolvimento de comunidades e famílias em uma abordagem coletiva do tabagismo entre pacientes afetados, custos de implementação desse política pública (os benefícios de uma abordagem sindêmica para pacientes que sofrem dessas condições provavelmente superariam os custos).

Recomendações: abordar a tuberculose (TB), o HIV / AIDS e a sindemia de tabaco no Brasil.

1. Pesquisas operacionais ou de implementação que levasse em conta os determinantes sociais comuns dessas condições.

2. É necessário abordagens abrangentes e baseadas em políticas públicas devem ser implementadas ao mesmo tempo que intervenções comportamentais clínicas.

3. Aproveitamento da atenção básica e do programa brasileiro para abordagem ao tabaco fornecem um cenário adequado para testar intervenções entre populações altamente vulneráveis afetadas pelo HIV / AIDS, tuberculose e sindemia de tabaco.

3- De acordo com o texto qual o significado dos termos abaixo: (1,0)

a) Households: membros da familia (que vivem na mesma casa)

b) Health: saúde

c) oropharyngeal diseases: doenças orofaríngeas

d) risk behaviors: comportamento de risco

e) physicians: médicos

4- De acordo com o texto traduza o texto abaixo: (0,5)

“Persons with TB and HIV/AIDS who use tobacco may not access health care or social supports necessary for health behavior change”

“As pessoas com TB e HIV / AIDS tabagistas podem não ter acesso a cuidados de saúde ou apoio social necessários para a mudança de comportamento em saúde”