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LETTER TO THE EDITOR:

THE URGENT NEED FOR A POPULATION BASED BREAST SCREENING PROGRAM FOR THE EARLY DETECTION OF BREAST CANCER IN PAPUA NEW GUINEA

***RUTH PAPE^{1,2} KELLY MAREE SPUIR³, PIUS UMO²**

1. School of Medicine and Health Sciences, Discipline of Medical Imaging Science, University of Papua New Guinea, Papua New Guinea
2. Pacific International Hospital, Boroko, NCD, Papua New Guinea
3. School of Dentistry & Health Sciences, Faculty of Science, Charles Sturt University, Wagga Wagga, NSW, Australia

Running title: *Central coordination is the key to developing a breast cancer screening in PNG*

*Corresponding author: ruth.pape@cqumail.com

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*RUTH PAPE^{1,2} KELLY MAREE SPUUR³, PIUS UMO²

4. School of Medicine and Health Sciences, Discipline of Medical Imaging Science, University of Papua New Guinea, Papua New Guinea
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Dear Editor,

The continued rise in the incidence of breast cancer in Papua New Guinea (PNG) and the need for a coordinated approach to combat the burden of the disease has been acknowledged in the National Health Plan 2011-2020 [1]. The World Health Organisation (WHO) lists breast cancer as the female cancer with the highest incidence and the leading cause of mortality amongst women in PNG. In 2020, 1 570 new cases of breast cancer were diagnosed representing 23.2% of all cancers reported and 847 (11.6%) deaths [2]. It must however be recognized that the true incidence of breast cancer in PNG is unknown as even registrations at the new National Cancer Registry [3] do not

accurately reflect the true rates of mortality and morbidity as surveillance remains ad hoc and many cancers continue to be undiagnosed and unreported [4].

Decreased morbidity and mortality from breast cancer in developed countries has largely been attributed to early detection through evidenced based population screening where mammography [5] is used as a screening tool to detect breast cancer in its pre-clinical stage in a targeted population. Though population screening is costly, the benefits of the early detection are well documented [6-8]. In established programs with participation rates of 85% or higher, mortality reduction has been reported at 40% [8-9]. Although desperately

needed, the challenge for PNG as a low resource country to implement such a program is large.

In PNG the National Cancer Control Program [10] is the vehicle used by the Government to support all aspects of cancer by overseeing; advocacy, data collection and analysis, prevention, early detection, diagnosis, treatment and rehabilitation. Notwithstanding the government's recognition of the problem in the National Cancer Policy 2015 [10] and commitment to turn policy into action through strategies such as the Cancer Action Priorities for 2017-2021 [4], very little progress has been made to date. Current Government and non-government efforts to progress and better manage the impact of breast cancer by raising public awareness through education, improving access to diagnostic and treatment services in PNG is commendable, but stagnated and not currently coordinated. The importance of addressing this issue and the need to establish a dedicated breast screening service in PNG is self-evident [11-16].

The first quasi population screening for breast cancer was undertaken by the Pacific International Hospital (PIH) between 2005 and 2009. Over 3000 women voluntarily undertook breast imaging, courtesy of a free screening program sponsored by the PNG Motor Vehicle Insurance Limited (MVIL), with a similar initiative currently sponsored by the PNG National Gaming Control Board (NGCB). Current access to mammography services is through the Port

Moresby General Hospital (PMGH) and the PIH, both in the National Capital District (NCD). Mammographic imaging is also available at the Australian New Guinea Administrative Unit (ANGAU) Memorial Hospital; however this mammography unit is currently not operational due to technical faults. It is possible that other Provincial Hospitals may also provide mammography services within their radiology departments that we are not aware of and we acknowledge them for their service.

The burden of workload in PMGH combined with limited skilled manpower and substandard equipment means that implementation of a mass screening program with the current resources is simply not feasible. Additionally, the average PNG woman cannot afford the cost of diagnostic mammography at PIH when she presents with symptoms; let alone self-funded screening.

Without a dedicated program in place, the tireless efforts of government and non-government agencies to promote breast cancer awareness through various activities although commendable become counterproductive due to the lack of access to imaging services. Without access to imaging services increased education serves only to create anxiety and despair both amongst asymptomatic women wanting to act upon their raised awareness and engage breast screening or symptomatic women wanting to obtain a diagnosis. There is currently no pathway for women seeking either preventative health measures (mammography screening) or

diagnosis of disease through diagnostic imaging to follow, and no central coordination between all stakeholders to ease the burden of disease – likened to agenesis of the corpus callosum of the brain – *resulting in the non-coordination between the left and right cerebral hemispheres*. The Cancer Action Priorities for 2017-2021 states that moving forward an evidence base is needed to develop a comprehensive approach to the problem [4]. There is very little written on breast cancer from a PNG perspective outside of our research. Our peer reviewed and published papers are groundbreaking [17-20], a brief summary of our findings is outlined as follows:

The first study [17] examined the participation rates in the free program sponsored by PNG MVIL. In the snapshot of PNG women surveyed, low participation rates were seen to be influenced by various interrelated factors inherent in both the PNG environment and culture, in particular lack of transport infrastructure, financial burden and sexual harassment. As low participation reduces the effectiveness of population-based screening, any proposed program in PNG would need to address these substantive underlying issues which have been identified as significant barriers to participation.

The second study [18] reported for the first time the mammographic parenchymal patterns (MPPs) of PNG women, establishing an important baseline for future studies and informing breast cancer risk. Increased breast

density is known to correlate with an increased risk for breast cancer and can inform the need for a more aggressive imaging regime. We however found that there was no unique distribution of MPPs in PNG women and therefore no increased risk of breast cancer based on the breast density profile of the women in our sample. Unfortunately, this result does not help to explain the high incidence of breast cancer in PNG but does support the use of routine mammographic imaging as the primary tool for breast screening.

The third study [19] investigated key risk factors for breast cancer and correlation with breast density. Results demonstrated that there was no clear relationship across almost all data. Factors that were weakly associated with increased breast density in PNG included parity, marital status, smoking, alcohol, and hormonal replacement therapy (HRT) use. Breast cancer risk was shown to be reduced for married women and those with increased parity suggesting a link to reproductive life.

The final study [20] investigated correlations between BI-RADS (a scoring system used in radiologist reports to describe the level of suspicion for cancer) category, age and MPP. Importantly, there was no correlation demonstrated between the high-risk BI-RADS categories 4 and 5 for breast malignancy and high-risk Tabár Type IV and V MPPs. The results of this study again reflect that the incidence of breast cancer in PNG cannot be explained by breast density. Results of this

study and other data indicate that any formalised screening program in PNG should have a target age group aimed at women younger than that of Western screening programs to capture women most at risk of breast cancer.

In conclusion, we support a continued push to see the realization of current government strategies on cancer priorities including breast cancer. The need for a population-based approach to the early detection of breast cancer in PNG is urgent. It is imperative that the PNG Government establish a service that is appropriately resourced and can be easily accessed by our women population and all relevant stakeholders if we are to make any future progress in easing the burden of breast cancer in PNG. To do this the current agensis needs to be overcome, with any attempts to implement a breast screening program taking a collaborative approach and being supported through a partnership between the public and private health care systems.

Our research findings [17-20] have provided insight into breast cancer and mammography in PNG. It is our hope that these insights will be used to uniquely inform a national screening program for the women of PNG moving forward.

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