Cardiology in the Young

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Sheila Glennis Haworth CBE

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Paediatric Cardiology Hall of Fame

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Sheila Glennis Haworth sadly died on Friday 23 October, 2020 at her home. She was 81 years old. She was the British Heart Foundation Professor of Developmental Cardiology at the Great Ormond Street Hospital and Institute for Child Health for 17 years and a past President of the Pulmonary Vascular Research Institute. She was widely regarded, during her 55-year career, as a leading scientist, renowned clinician, esteemed mentor, advocate, and global ambassador for improving diagnosis and treatment of pulmonary hypertension in children, not only in Britain but also globally.

Sheila Glennis Haworth[1] was born in 1939. Her early education was in Keighley, West Yorkshire. She finished her medical degree in London in 1964. She started her medical career in London as a pre-registration house doctor at the Royal Free Hospital, and then trained in paediatric medicine at the Queen Elizabeth Hospital for Children. In 1967, she was a fellow for one and a half years in Fetal Physiology and Neonatology at the Presbyterian & Babies Hospital, Columbia University, New York. This was the milestone that pointed to her future career. She returned to the United Kingdom as a junior doctor at the Hammersmith Hospital and the Great Ormond Street Hospital for Sick Children until 1971. During these years, she showed a great passion for academic work, which led her to join the paediatric developmental biology and pathology initiative under Professor Lynne M. Reid[2] at the Department of Experimental Pathology of the Cardiothoracic Institute in Brompton Hospital. There she worked on the developmental vascular pathology of CHD, and the in utero and neonatal modulation of vascular growth and function. These works resulted in the publication of seven papers[3,4,5,6,7,8,9] and her MD thesis in 1976. She

[1]Prof. Sheila Glennis Haworth always liked to be referred to as "Glennis", thus we will use that in this tribute.

[2]Prof. Lynne M. Reid was a leading researcher of the developmental biology of the lung, and a pioneer in the study of pulmonary hypertension, particularly in cases where patients have CHD. She was the first woman to achieve the rank of professor of experimental pathology in England; the first woman dean of the Institute of Diseases of the Chest, London University. She accepted a position on the faculty of Harvard Medical School in 1976, as one of the school's few women faculty members.

[3]Haworth SG, Reid L. Persistent fetal circulation: newly recognized structural features. J Pediatr 1976; 88:614–20.

[4]Haworth SG, Reid L. Structural study of pulmonary circulation and of heart in total anomalous pulmonary venous return in early infancy. Br Heart J 1977; 39:80–92.

[5]Haworth SG, Reid L. Quantitative structural study of pulmonary circulation in the newborn with aortic atresia, stenosis or coarctation. Thorax 1977; 32:121–8.

[6]Haworth SG, Reid L. Quantitative structural study of pulmonary circulation in the newborn with pulmonary atresia. Thorax 1977; 32:129–33.

[7]Haworth SG, Reid L, Simon G. Radiological features of the heart and lungs in total anomalous pulmonary venous return in early infancy. Clin Radiol 1977; 28:561–9.

[8]Haworth SG, Sauer U, Bühlmeyer K, Reid L. Development of the pulmonary circulation in ventricular septal defect: a quantitative structural study. Am J Cardiol 1977; 40:781–8.

[9]Haworth SG, Reid L. A morphometric study of regional variation in lung structure in infants with pulmonary hypertension and congenital cardiac defect. A justification of lung biopsy. Br Heart J 1978; 40:825–31.

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was appointed as Senior Lecturer and Honorary Consultant at the Great Ormond Street Hospital for Sick Children and the Institute of Child Health, London in 1977. When Professor Reid took her new position at Harvard Medical School, she invited Glennis to Boston as a visiting fellow to co-mentor the new fellows there. It was during one of these trips, she met Dr Marlene Rabinovitch.[10] Marlene recounted her first impression of Glennis as: "*Glennis gave us the first impression as an elegant, bright and kind young scientist who came from England. She helped us in our research, and we published together one of my earliest papers on pulmonary vascular changes in congenital heart disease.*[11] *I remember we celebrated together in Boston her new position as a consultant at Great Ormond Street* ". She added "*Glennis became a lifelong friend, and we met regularly at meetings and when we visited each other's centres. We always went together to theatres when I visited London*".

In the 1980s, Glennis established herself as a clinician/scientist of an international standing. She was promoted to a Reader[12] and Subdean of the Institute of Child Health in 1982. Six years later, she became a Professor of Paediatric Cardiology and the Director of the Institute of Child Health. In 1990, the British Heart Foundation endowed her Chair of Developmental Cardiology, a position she remained in for 17 years until she retired in 2004. She was the first female BHF professor.

She consolidated her basic research on the development of the pulmonary vasculature and its relationship with the CHD and on the pathobiology of pulmonary hypertension. She successfully aligned her basic research with her clinical duties with children with CHD,[13] which was unique in Britain. She became a role model for other scientist and clinicians in the United Kingdom. Her lifelong colleague, Dr Alison Hislop, wrote: "*It was a pleasure and an honour as a scientist and a woman to work side by side with Glennis for over 40 years. Her aim was to improve the clinical management of children with abnormal structure and function of the pulmonary circulation. As a clinician she used laboratory science to understand the normal and abnormal and respected the views and work of the scientists with whom she surrounded herself. She cared for her colleagues, their future careers and their health and happiness*". Her clinical fellows admired the way Glennis applied her basic knowledge to the daily clinical practice, Dr Astrid Lammers[14] said: "*Glennis was in any way a very inspiring personality. thorough knowledge, deep insight and understanding of the pathophysiology, combined with an empathic clinical dedication and commitment. The hybrid approach of Professor Haworth was inspiring, she* taught *us how to use the basic knowledge to apply to the ever-changing clinical progress of the patients. She was certainly ahead of her time, enforcing a strategy to treat children with pulmonary hypertension early and aggressively, knowing the detrimental impact of long-standing disease on the pulmonary vasculature*".

One of Glennis' special interests was the role of prostacyclin and its derivatives in the clinical application in children with pulmonary hypertension.[15] This came after the early observation that PGI_2 induced vasodilation or effects.[16] Professor Timothy Higginbotham's team from Papworth Hospital in Cambridge showed that prolonged infusion of PGI_2 with its vasodilatory properties leads to a marked improvement in young adults with primary pulmonary hypertension. Dr Ian Adatia[17,18] was approached serendipitously by Glennis at the end of 1980s to join her research team as a laboratory and clinical fellow to study the metabolism of thromboxane A_2 and PGI_2 and endothelin in pulmonary hypertensive CHD. These studies helped to provide a therapeutic rationale for the use of PGI_2 and endothelin antagonists in CHD in the 1990s and in the 2000s.

In the 1990s, Glennis continued her basic research on the developmental pharmacology of the pulmonary vasculature in the fetus and neonate[19,20,21,22,23,24,25,26,27,28,29], with particular emphasis on the use of new therapies in children. She also carried out extensive work on the preservations of the pulmonary vascular bed, which

[10]Now Prof. Marlene Rabinovitch, Head of Cardiopulmonary Research Program, Department of Pediatrics Stanford University School of Medicine, Stanford, CA, USA.

[11]Rabinovitch, M., S. Haworth, Z. Vance, G. Vawter, A. Castaneda, A. Nadas, and L.Reid. Early pulmonary vascular changes in congenital heart disease studied in biopsy tissue. Hum . Pathol . (Suppl.) 11: 499–5,091,980.

[12]Reader (English system equivalent to Associate Professor).

[13]Haworth SG. Pulmonary vascular bed in children with complete atrioventricular septal defect: relation between structural and hemodynamic abnormalities. Am J Cardiol 1986; 57: 833–9.

[14]Dr Astrid Lammers was Prof. Haworth's Clinical Fellow at the end of first decade of 2000 and worked as a consultant for the Pulmonary Hypertension Service before returning to Germany, where she now works as a consultant in Paediatric Cardiology and Intensive Care Medicine and is the Lead of the Pulmonary Hypertension Clinic for children, which she established at Munster University Hospital in 2014.

[15]Haworth SG, Silove ED. Pulmonary arterial structure in pulmonary atresia after prostaglandin E2 administration. Br Heart J 1981; 45:311–626.

[16]Barst RJ. Pharmacologically induced pulmonary vasodilation in children and young adults with primary pulmonary hypertension. Chest.1986; 89:497–503.

Bush A, Busst C, Booth K, Knight WB, Shinebourne EA. Does prostacyclin enhance the selective pulmonary vasodilator effect of oxygen in children with congenital heart disease? Circulation.1986; 74:135–144.

[17]Dr Ian Adatia is a Consultant Community Pediatric Cardiologist at Souffle au Coeur, Glenora Children's Heart & Echo Clinic, Edmonton, Canada.

[18]Adatia I, Barrow SE, Stratton P, Ritter JM, Haworth SG. Abnormalities in the biosynthesis of thromboxane A2 and prostacyclin in children with cyanotic congenital heart disease. Br Heart J 1993; 69(2):179–182.

Adatia I, Barrow SE, Stratton PD, Miall-Allen VM, Ritter JM, Haworth SG. Thromboxane A2 and prostacyclin biosynthesis in children and adolescents with pulmonary vascular disease. Circulation 1993; Vol 88(5):2117–2122.

Adatia I, Barrow SE, Stratton PD, Ritter JM, Haworth SG. Effect of intracardiac repair on thromboxane A2 and prostacyclin biosynthesis in children with a left to right shunt. Brit Heart J 1994; 72:452–456.

[19]Rinaldi M, Hislop AA, Odom N, McGregor CGA, Haworth SG. Surgical factors affecting growth potential of the immature rat lung. Eur J Cardio-Thorac Surg 1991; 5:218–222.

[20]Adatia I, Haworth SG. Circulating endothelin in children with congenital heart disease. Br Heart Journal 1993; 69(3):233–236.

[21]Mills AN, Haworth SG. Greater permeability of the neonatal lung: postnatal changes in surface charge and biochemistry of porcine pulmonary capillary endothelium. J Thorac Cardiovasc Surg 1991; 101(5):909–916.

[22]Liu S, Hislop AA, Haworth SH, Barnes PJ. Developmental Changes in Endothelium-Dependent Pulmonary Vasodilatation. Br J Pharmacol 1992; 106:324–330.

[23]Hislop AA, Springall DR, Pollock JS, Polak JM, Haworth SG. Abundance of endothelial nitric oxide synthase in newborn intrapulmonary arteries. Arch Dis Child Fetal Neonatal Ed. 1995; 73(1): F17–21.

[24]Komai, H. and Haworth,S.G. Thrombomodulin and angiotensin converting enzyme activity during paediatric open heart surgery. Annals of Thoracic Surgery 1996; 62: 553–558.

[25]Evans AM, Osipenko, ON, Haworth SG, Gurney SG. Resting Potentials and Potassium Currents during the Development of Pulmonary Artery Smooth Muscle Cells. Am J Physiol 1998; 275:H887–H899.

[26]Adatia I, Kemp GJ, Taylor DJ, Radda GK, Rajagopalan B, Haworth SG. Abnormalities in skeletal muscle metabolism in cyanot¬ic patients with congenital heart disease – a P-3l nuclear magnetic resonance spectroscopy study. Clin Sci 1993; 85(1):105–109.

[27]Hislop AA, Mak JCW, Reader JA, Barnes PJ, Haworth SG. Muscarinic receptor subtypes in the porcine lung during postnatal development. Eur J Pharmacol 1998; 359:211–221.

[28]Matsushita T, Hislop AA, Boels PJ, Deutsch J, and Haworth SG. Changes in ANP responsiveness of normal and hypertensive porcine intrapulmonary arteries during maturation. Ped Res 1999; 46: 411–418.

[29]Hall SM., Gorenflo M, Reader J, Lawson D, and Haworth SG. Neonatal pulmonary hypertension prevents reorganisation of the pulmonary arterial smooth muscle cytoskeleton after birth. J Anat 2000; 196: 391–403.

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was important during a period when heart and lung transplantation was emerging as a successful treatment modality for end-stage pulmonary vascular disease[30,31,32,33,34].

In the late 1980s and throughout the 1990s, she became a visiting consultant to care for children with pulmonary hypertension in satellite outreach clinics in Cambridge, Peterborough, and Bradford, this led her to be extensively involved in the training of a new generation of clinicians, nurses, and allied health professionals in the United Kingdom. This effort later evolved into a national clinical network and registry for childhood pulmonary vascular diseases.

She retired officially in 2004. She became an Emeritus Professor, continuing the supporting colleagues with undiminished zeal in academic and clinical arenas, but with more emphasis on the clinical aspects of pulmonary hypertension.[35] She has engaged herself in new therapeutic treatment options, such as atrial septostomy and clinical application of newly available drugs as effective therapies for children and adolescents. She was heavily involved in various international clinical trials and establishing consortia and advisory committees for neonates and children with pulmonary hypertensive vascular diseases.[36] She continued travelling and often visited outreach clinics across England and Scotland with the same dedication and energy. Many of her previous fellows said that they would never have thought that she was retired.

With the introduction of new medicines to treat pulmonary hypertension in adults, Glennis realised the need to expand her satellite outreach clinics in the United Kingdom that she established after 1987. In 2001–2002, she worked to establish the United Kingdom network to manage children with pulmonary hypertension. The network was quickly approved by the National Specialist Commissioning Advisory Group and was commissioned in 2007 by the National Health Service leading the establishment of many paediatrics pulmonary hypertension clinics in England.[37] Glennis as the lead physician regularly travelled to all these clinics. On her full retirement, she passed the responsibility of this network to her successor, Dr Shahin Moledina, who was her clinical fellow and her MD student.

She played a crucial role in the establishment of the patients' charity association (the Pulmonary Hypertension Association UK) in 2000. This organisation is now a vital player in helping pulmonary hypertension patients, their family and health professionals, as well as raising awareness of this severe condition.

She was also involved in the executive committee and research fund committees of the British Heart Foundation. She also took part in the scientific organisation of the World Health Symposium on Pulmonary Hypertension in 1997 and became a member of paediatric task forces. She also served on working parties for the European Society of Cardiology in pulmonary hypertension, the management of cardiovascular research, and the National Health Service paediatric research networks. She was also active in providing expert witness advice for the General Medical Council and was an advisor to pharmaceutical companies and to the European Medicines agencies. In 1998, she participated in the Eighth World Congress of Cardiology in Rio de Janeiro. Glennis was an active participant who significantly contributed to the Second World Symposium on Pulmonary Hypertension of 1998 in Evian, which was one of the prime meetings that drew the first strategy global pulmonary hypertension. We still feel the impact of this today.

Her scientific output was extraordinarily impressive. She published 196 original articles in peer review journals, 30 review articles, and 57 chapters in various books. She also participated in 12 editorials, annotations, guidelines, and reviews. Her output and reputation helped Glennis to receive over 41 research grants from multiple sources.

She supervised the PhD or MD thesis of nine students and has been an examiner for various PhD candidates in different European and international universities. She has been active in other international universities as an honorary chair of their paediatric cardiology, such as the University of Lund, in 1996 and 1997 and Glasgow University and Johns Hopkins University and Harvard Medical School in 2003 and 2008.

Her extraordinary international appeal took her on many trips all over the world. At a young age in 1975, she travelled to India on the invitation of the British Council visiting centres in Bombay, Madras, Trivandrum, Calcutta, and Bangalore, and since that time, she had a particular passion for the Indian subcontinent, so continued to visit and worked there when she could. She continued her international trips all her career, even after she officially retired. She was in demand in many international meetings, giving over 300 international key opinion lectures and taking part in several symposia in Asia, Japan, the Middle East, Europe, Africa, and the United States of America. In the last 15 years, I have been with her on various travels, and it was always a pleasure to be in her company, her cultural appeals and pleasant conversations were of particular note.

Her extensive involvement in clinical and basic research that results in treating this problematic and often incurable group of children was nationally and internationally recognised. Her Majesty, the Queen, awarded her the Commander of the Order of the British Empire[38] in 2007 for her extraordinary lifelong service to the patients and for her other distinguished national clinical achievements (Fig 1).

Glennis has been an active member in the last 15 years since the foundation of the Pulmonary Vascular Research Institute (PVRI) in 2005/2006. She contributed to establishing the structure and *Modus operandi* and the global aspects of the PVRI with the other 25 experts during the first meeting of PVRI in January, 2007 in Malta. In the beginning, she concentrated her effort on building

[30]Hislop AA, Odom N, Rinaldi M, McGregor CGA, Haworth SG. Surgical factors affecting growth potential of immature rat lung. Europ J Cardiothorac Surg 1991; 5:218–222.

[31]Komai H, Haworth SG. Effect of Cardiopulmonary Bypass on the Circulating Level of Soluble GMP-140. Ann Thorac Surg 1994; 58:478–82.

[32]Hall SM, Odom N, McGregor CGA, Haworth SG. Transient ultrastructural injury and repair of pulmonary capillaries in transplanted rat lung – effect of preservation and reperfusion. Am J Resp Cell Mol Biol 1992; 7(1):49–57.

[33]Hall, S.M. and Haworth, S.G. Effect of cold preservation on cultured pulmonary arterial smooth muscle cells. Am J Physiol 1996; 14:L435–L445.

[34]Hislop AA, Lee RJ, McGregor CGA, Haworth SG. Lung growth after transplantation of an adult lobe of lung into a juvenile rat. J Thorac Cardiovasc Surg 1998; 115:644–651.

[35]Orte C, Polak JM, Haworth SG, Yacoub MH, and Morrell NW. Expression of Pulmonary Vascular Angiotensin-Converting Enzyme in Primary and Secondary Plexiform Pulmonary Hypertension. J Pathol: 2000; 192(3): 379–84.

[36]Adatia I, Haworth S G,Wegner M, Barst RJ, Karnovsky A, Rosenzweig E, Aguilar C. Clinical Trials in Neonates and Children: Report of the pulmonary hypertension research consortium paediatric advisory committee. Pulmonary Circulation 2013.3;(1):252.

[37]List of hospitals in the network: Freeman Hospital, Newcastle upon Tyne; Bristol Hospital for Children; Birmingham Children's Hospital; Leeds General Infirmary; Southampton General Hospital; Yorkhill Hospital, Glasgow; and the Royal Hospital for Children, Belfast.

[38]CBE stands for Commander of the Order of the British Empire. It was an award bestowed to people as a recognition of a positive impact and service made in their work in the United Kingdom. CBE is the highest-ranking Order of the British Empire award, followed by OBE and then MBE.

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Figure 1. Professor Haworth with her husband Major General Leslie Busk CB, after receiving the CBE medal from her Majesty, the Queen.

a network in the Indian subcontinent and led the Indian subcontinent and South Asia task force with Dr Krishna Kumar (Fig 2). The task force under her leadership was very active in establishing yearly "All India Pulmonary Hypertension" meetings. The first took place in Cochin in 2007, followed by other meetings in Delhi (2008), Chandigarh (2009), Hyderabad (2010), and Trivandrum (2011). She also contributed to the biyearly PVRI High-Altitude meetings in Leh, Ladakh, North India. She supported the establishment of the Indian database of pulmonary hypertension and co-edited the pulmonary hypertension book in India. Glennis worked hard to provide many research programmes in India and established a PhD fellowship and other awards with a grant from GSK through the PRVI.

Furthermore, she became the first leader of the PVRI Paediatric task force, which established a global network of clinicians and basic scientists to manage strategy, education, research, and global awareness of pulmonary hypertension in children. Under her leadership, this task force organised international meetings, mainly in India and South America (Fig 3). The task force also published the expert and global guideline for the management of pulmonary hypertension in children.[39]

She was the President of the PVRI from 2014 to 2016. During her presidency, a significant restructuring of the PVRI modus operandi and revising the PVRI constitution, including revision of the governing structure took place. In 2015, she appointed a publishing manager for the "Pulmonary circulation" journal and produced a successful business plan, which was later funded by the CMREF and established a 7-year plan to secure sustainable finance for the journal. This then led to the establishment of the fundraising scheme for the PVRI during her presidency (Fig 4).

Furthermore, she enhanced the structure and the appeal of the PVRI Annual World Congress on Pulmonary Hypertension. The two conferences under her presidency in Guangzhou, China in 2015 and Rome, Italy in 2016 were a turning point in the attendance and organisation making the subsequent annual meetings an international event. She continued with the same zeal in supporting all the activities, as a past president from 2017 to 2019. She remained a member of the PVRI Executive Committee (Fig 5).

The PVRI honoured her role by a special annual named lecture during the PVRI annual meetings.

Glennis was an extraordinary person who was relentless in her pursuit of excellence, a tower of strength and resilience. Her determination to do the right thing was exemplary. At the same time, she was thoughtful and empathic to her colleagues, fellows, and staff. Dr Astrid Lammers said "*She was an example to us. She was kind, showing extraordinary loving care to her children patients. One day a young girl seen in the outpatient clinic asked Professor Haworth about where she lived? Prof Haworth took the girl to her office from the clinic through the corridors of Great Ormond street, When Glennis took a seat behind her desk, the little girl climbed on her lap to get a better view of her office. When she spotted the small fridge underneath her desk, the girl was very happy, and said : Now I can see, where you live, Doctor.*"

She was extraordinarily supportive and protective of her clinical and research fellows. Dr Ian Adatia (Fig 6) summarised the legacy of Glennis as a mentor by saying "*She was incredibly involved with her research fellows. She was a tremendous mentor. She let you do almost whatever you wanted and encouraged and permitted you to use your imagination without stopping you until she felt it was time to gently but firmly lead you back on tract, You were aware always, that in the background, she was nudging you in the direction that would be the most fruitful for you. She gave you confidence in yourself, especially those of us who had done no previous research and allowed us to take pride in the work of the team. You know, I worked for many people in my career, and she taught me that if you work with a young person and they do good work, give them as much credit as possible. That is good for their confidence and career. And eventually, it comes back to the mentor as a huge reward with continued lifelong tributes*". He added, "*I had the good fortune to work with both Glennis and before with Marlene (Rabinovitch) in Toronto. They both always gave credit. Sometimes more than they needed, to their aspiring junior faculty. They gave them a lot of confidence. When I mentored people later, I tried to do what Glennis and Marlene taught me: Acknowledge every single person who is helping you as in the end that brings everyone success and pleasure in the work*". It is not surprising that Drs Ian Adatia and Marilyne Lévy[40] described Glennis as their second mother or "autre mère".

She was described as a "balanced and charismatic leader", who radiated a genuine compassion for all people and their suffering. She was a tower of strength and resilience, could see both sides of a problem, and rarely took one side or the other unless she saw injustice or impropriety. She tried to create harmony when any disputes emerged. She was on the PVRI Board of Directors (Fig 5) since the inception and her co-board members bear a

[39]Cerro MJ, Abman S, Diaz G, Freudenthal AH, Freudenthal F, Harikrishnan S, Haworth SG, Ivy D, Lopes AA, Raj JU, Sandoval J, Stenmark K, Adatia I.A consensus approach to the classification of pediatric pulmonary hypertensive vascular disease: Report from the PVRI Pediatric Taskforce, Panama 2011. Pulm Circ. 2011;1(2):286–298.

[40]Dr Marilyne Lévy was a fellow with Prof. Haworth between 1991 and 1992 working on endothelial function in piglets at birth, She is now a Consultant Pediatric Cardiologist at Service de Cardiologie Pédiatrique, Hôpital Necker-Enfants Malades, Faculté de Médecine Paris, France.

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Figure 2. Prof. Haworth at one of the regular Indian subcontinent task force meetings.



Figure 3. In Cartagena, Columbia during the First PVRI Latin American Conference on Paediatric Pulmonary Hypertension in which Prof. Haworth was co-organiser.

witness to these attitudes. It is noticeable that she always checked with her colleagues about their welfare and how they were doing. Her empathy was extraordinary. During all the years I have known Glennis, the first Christmas card we received each year was always from her and Leslie!

Glennis was stylish and elegant even when working in clinics or hospitals. Her appearance and attire were admired by those who worked with her. Her social grace was amazing, enjoyable, friendly, and very pleasant, which could be felt when talking to her. She was very cultured and always enjoyed engaging her fellows and colleagues in amusing yet intellectual and learned subjects (Fig 7).

Stephanie Barwick wrote "*When I became CEO of the PVRI in 2014, Glennis was the nominated President and she was pivotal to*

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Figure 4. Prof. Haworth presenting the PVRI Charity Music concert at the University of Kent during pulmonary hypertension day of 5 May, 2015.



Figure 5. Prof. Haworth with the other members of the board of directors.

my success in the PVRI. The way I would describe her as President was someone who was wholly dedicated to the job. Everything she embarked upon, she did with complete commitment. She was very focused on the needs of the developing world problems of doctors in these isolated and distant countries and the focus of her Presidency. Secondly, I would describe her as a person in tune with the other person. She took a personal interest in people. It was a huge privilege and honour to know her and learn from her. She was a beautiful human being, whom I will always hold dear in my heart and have the fondest memories of. In her lifetime, she was the PVRI guardian. Maybe she has now become our guardian angel".

She enjoyed music and theatre and it was no secret that many overseas colleagues enjoyed going to the theatre with her and her husband in London when visiting. In her later years, she learned to play the piano and even continued taking her lessons on Zoom during the recent lockdown. She achieved Piano Grade 8.

She often took the pleasure of painting with watercolour. I remember during our journey in 2009 in North India, she used to take her watercolour, sitting elegantly painting the beautiful North Indian countryside. I watched with admiration and enjoyed the beautiful outcome of her painting.

She and her husband Major General Leslie Busk CB were completely and utterly devoted to one another. Her stepchildren and grandchildren, called her "Granny Glen" such was their complete acceptance and love for her. She enjoyed visiting them regularly in the United Kingdom and the United States of America. She nursed with dedication her sister, who suffered from an intractable illness in her final years.

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Figure 6. Prof. Haworth, Dr Ian Adatia to her left and Prof. Ghazwan Butrous to her right.



Figure 7. Prof. Haworth with Dr Astrid Lammers, clinical nurse specialist Yvette Flynn, and the team's secretary Barbara Margetts at the Ladies' Day at Ascot.

She had a particular love for her two Labrador dogs, "Petrus" who is black and the fox red Romanee; she insisted on having the photo of the older dog, Petrus at her PVRI presidential inauguration.

Glennis will be dearly missed by her beloved husband, step-children, grandchildren, and all her colleagues and patients all over the globe. May she rest in eternal happiness and peace.

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