

Can Research Accelerate Progress Toward Millennium Development Goal 5 (Maternal Health) in Jamaica?

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ABSTRACT

The Ministry of Health and the University of the West Indies have collaborated over 25 years to develop the evidence base to improve maternal health. The experience is reviewed as a model to accelerate Jamaica's progress toward achieving the Millennium Development Goals (MDGs). The process included measuring the disease burden due to maternal morbidity and mortality; developing and field testing interventions to manage the leading problems, national scale-up, monitoring and evaluation. This began with developing clinical guidelines to manage the hypertensive disorders of pregnancy while establishing high risk (referral) antenatal clinics, expansion and upgrading of referral facilities, and audits to identify barriers to quality healthcare, including establishing maternal mortality surveillance. As we succeed, research funds have become scarce, limiting support to postgraduate students, a reliable, cost effective resource pool capable of undertaking the research needed to provide the evidence base to influence public policy more widely. A locally financed resource pool is needed to support fellowships for graduate students to accelerate their training and availability to contribute to national development. The model from Thailand is put forward for consideration. The operations research model for maternal health can be transferred to other MDG objectives. As Jamaica pursues its goal of developed nation status, and international grant financing shrinks, local civil society will need to fill the vacancy and invest in the most abundant natural resource, young people.

¿Pueden las Investigaciones Acelerar el Progreso Hacia el Cumplimiento del Objetivo 5 (Salud materna) de Desarrollo del Milenio en Jamaica?

A McCaw-Binns

RESUMEN

El Ministerio de Salud Pública y la Universidad de West Indies han colaborado por más de 25 años para desarrollar la medicina basada en la evidencia a fin de mejorar la salud materna. Se revisa la experiencia como modelo para acelerar el progreso de Jamaica hacia el cumplimiento de los Objetivos de Desarrollo del Milenio (ODM). El proceso incluyó medición de la carga de enfermedad debido a la morbilidad y la mortalidad maternas, desarrollo y prueba probar en el terreno de las intervenciones para tratar los problemas principales, así como la ampliación, monitoreo y evaluación a escala nacional. Esto comenzó con el desarrollo de guías clínicas para el tratamiento de los trastornos de hipertensión durante el embarazo, al mismo tiempo que se creaban clínicas antenatales (casos referidos) para pacientes de alto riesgo, se establecía la ampliación y mejoramiento de las instalaciones para casos referidos, y se hacían auditorías a fin de identificar los obstáculos para un cuidado de salud de calidad, incluyendo el establecimiento de la vigilancia de la mortalidad materna. En la medida que tenemos éxito, los fondos de investigación se han hecho más escasos. Esto limita el apoyo a los costo-efectivos y confiables que permitan emprender las investigaciones necesarias para ofrecer una medicina basada en la evidencia, con una influencia más amplia en las políticas con el público. Se requiere un fondo de recursos de financiamiento local a fin de apoyar las becas para que los estudiantes graduados puedan acelerar su entrenamiento y aumentar su disponibilidad a contribuir con el

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desarrollo nacional. El modelo de Tailandia es expone a consideración. El modelo de investigación de operaciones para la salud materna puede transferirse a los ODM. En la medida que Jamaica persigue su objetivo de alcanzar un estatus de país desarrollado, y el financiamiento de becas se reduce, la sociedad civil local necesitará llenar la vacante e invertir en el recurso natural más abundante – la juventud.

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INTRODUCTION

In October 2007, maternal health advocates marked the 20th anniversary of the birth of the Safe Motherhood movement (1). On the 60th anniversary of the Faculty of Medical Sciences and The University of the West Indies (UWI) at Mona, Jamaica, I thought I would reflect on whether the academy can help accelerate Jamaica's progress toward the Millennium Development Goal (MDG) for Maternal Health. This paper was presented at a Breakfast Forum hosted by the University of the West Indies on the opening of the University Research Conference. The theme of the conference was "University of the West Indies, Regional Impact: Global Reach." Given the conference's theme – and the audience mix, the presentation includes some basic definitions and a review of the University's collaboration with Jamaica's Ministry of Health. The discussion broadly considers how we could team with the wider society to accelerate Jamaica toward developed nation status using our maternal mortality prevention model.

Historical Perspective

During slavery, plantation owners had little interest in the health of slaves until the slave trade was abolished in 1807. In the ensuing 25 years, as the slave population declined, their survival gained ascendancy. Owners began to actively engage doctors from England, who took special interest in maternal and newborn care. By 1833, 178 of 214 physicians and surgeons on the island were based in rural areas. With emancipation in 1838, owners no longer felt obliged to indulge female apprentices with such privileges as shorter working days during lactation and healthcare for them and their infants. Ex-slave women responded by withdrawing from the estate labour force. This impacted the salary of doctors who were paid on a capitation basis. Their exodus to England began and their numbers rapidly declined from around 300 at emancipation to only 75 (2 – 4).

The collapse of the estate health system led plantation owners to petition the government. In 1868, the first 15 government doctors were employed to care "paupers, indentured servants and the Constabulary". In 1875, the Island Medical Services was formally established, with a superintendent to supervise district medical officers (DMOs) across 41 medical districts.

In 1887, Dr Grabham, our first champion of women's health, responding to a maternal mortality rate exceeding 600/100 000 births, succeeded in establishing a 12-bed Lying-In Hospital on property adjacent to Kingston Public

Hospital. As it was established in the year of Queen Victoria's celebration of her golden jubilee on the throne, it was named in her honour (5). The hospital's main intent was to train midwives and its first graduates emerged two years later. By 1909, 143 midwives had been deployed to the parish of their choice to attend home births, supervised by the DMOs.

This early deployment of community midwives and the introduction of sulfur drugs and later penicillin, led to a significant fall in maternal deaths, especially from infection, in the first half of the 20th century. The emergence of graduates from UWI in the late 1950s contributed to the next significant wave which made pregnancy safer in Jamaica (Fig. 1).

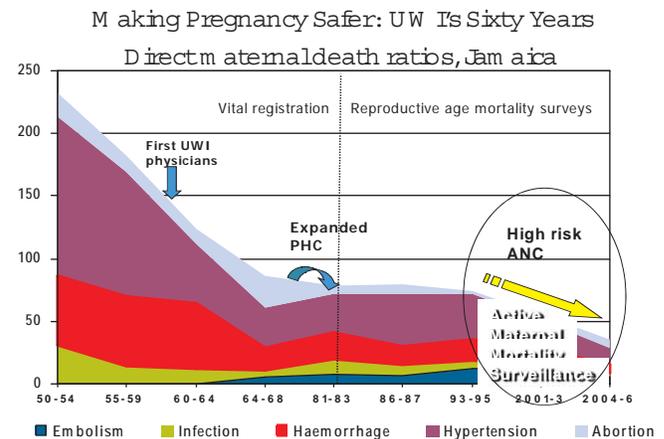


Fig. 1: Sixty year trend: Direct maternal death ratios, Jamaica.

Concepts and Definitions

A maternal death is the death of a woman while pregnant or within 42 days of delivery, from direct and indirect complications but not from (co)incidental causes. The World Health Organization (WHO), however, recognizes that with increasing medical technology, women die up to a year after delivery from complications which begin in pregnancy. These are late maternal deaths (6). Since 1981, Jamaica has monitored both maternal and late maternal deaths.

Direct deaths are those which result from complications attributable to being pregnant, such as a post-partum haemorrhage. Indirect deaths are due to conditions which can occur whether or not the woman is pregnant, such as heart disease or sickle cell disease. Co-incidental deaths are ostensibly unrelated to pregnancy. These now include

accidents, violence and medical conditions where pregnancy is an incidental finding, such as selected cancers. Accidents and violence however are debatable. In many countries, intimate partner violence is the leading cause of pregnancy-associated mortality (7–8).

To facilitate international comparison, the number of maternal deaths is expressed as a ratio per 100 000 live births. As maternal deaths become rarer, the multiplier moved from 1000 to 100 000 to convert the ratio to a whole number.

Millennium Development Goals and Reproductive Health

Of eight MDGs, four are relevant to reproductive health – promotion of gender equity and empowerment of women, and goals to reduce child mortality, combat AIDS, but most importantly to improve maternal health. The fifth MDG calls for a 75% reduction in maternal mortality between 1990 and 2015. For Jamaica, this would move from a baseline of 106 to 26 per 100 000 live births. Two other countries in the region are there or near there, namely Cuba and Costa Rica.

Reducing Maternal Deaths

Our development model applies the scientific method to reducing maternal deaths. First, we need an accurate estimate of the burden of disease. As our vital registration system provides unreliable estimates of maternal deaths (9–10), a surveillance system is needed. We then need to identify evidence based practices which will improve outcomes (11–13). These may have to be adapted to the local environment, piloted and monitored for effectiveness. The working model is then scaled-up with national training and roll-out exercises. The best plans need effective leadership and supervision, and must include routine monitoring, which is where the surveillance system factors in, supported by episodic evaluation (14). As environmental conditions and determinants change, strategies may need to be modified.

Jamaica's surveillance experience

As voluntary reporting of maternal deaths failed, maternal deaths were made into Class I notifiable events in 1998. Like malaria for example, health providers must now report cases on suspicion to health authorities. This is supported by an active surveillance system, where health teams visit hospitals regularly to look for cases.

Direct deaths—trends: 1981–87

The first two studies (10, 15) taught us that simply counting bodies was not enough; we had to rev-up the process and intervene. We began with the leading cause of death, hypertension.

Hypertension in Pregnancy Project: intervention and control areas

Starting in St Catherine, with St Ann and Manchester as control areas, we tested a comprehensive strategy to take care

of women with pregnancy-induced hypertension (11, 12). We hoped that early identification and treatment would reduce severe complications, including death. Our proxy indicator was eclampsia, a severe form of hypertension in pregnancy where women develop seizures which increases their and the baby's risk of death.

Community teams, including private doctors, were trained to identify cases early, refer them to hospital obstetricians and follow them to guarantee they attended the referral. Weekly high risk clinics ensured that every woman was seen the same week she was referred. Each eclampsia case was visited at home to identify and address the sources of treatment failures.

Compared to our pre-intervention years 1986–91, after identifying and dealing with mainly management problems, we started to reap rewards. By 1995, we had achieved a significant reduction in the incidence of eclampsia. The intervention was also cost effective as bed days required to treat eclampsia specifically, and hypertension generally, declined by 54%.

Regional differences in maternal mortality: 1993–95

The 1993–95 review (16) found persistently high mortality ratios in the north eastern region of Jamaica. While other regions had at least three obstetricians, the north east had only one. The Ministry of Health was committed to roll-out the St Catherine experience nationally. By 2001, they had set-up high risk clinics in most parishes and went further by upgrading Annotto Bay and May Pen hospitals to Type B facilities, adding obstetricians to those health teams. Obstetricians from Types A (*eg* Victoria Jubilee Hospital) or B (*eg* Mandeville) hospitals now visit parishes with only a Type C hospital (*eg* Portland) weekly to run high risk clinics. We have developed training manuals (17–19) and ran workshops to create a core of persons to train, supervise and monitor the process.

Jamaica's surveillance experience

With maternal deaths a notifiable event, we wanted to know how it was working. I tagged fieldwork onto another quality assurance project and got a fellowship from the principal's office to support a graduate student to do this and another project. To our delight, by 2000, 80% of deaths were being reported to the Ministry of Health (14).

By 2003, total mortality was trending down, with the improvement in direct deaths highly significant but negated by rising indirect deaths (9). The decline in direct deaths included a 24% decrease in deaths due to hypertension and 36% fewer haemorrhage deaths, particularly at referral hospitals. Indirect deaths increased mainly due to AIDS, which moved from zero cases in 1995 to become the fourth ranked cause of maternal death. Heart disease, sickle cell disease and diabetes are the other major problems. Asthma was also new (Figs. 2, 3).

Direct deaths - trends: 1981-2003

ratios/100,000 live births - public hospitals: Jamaica

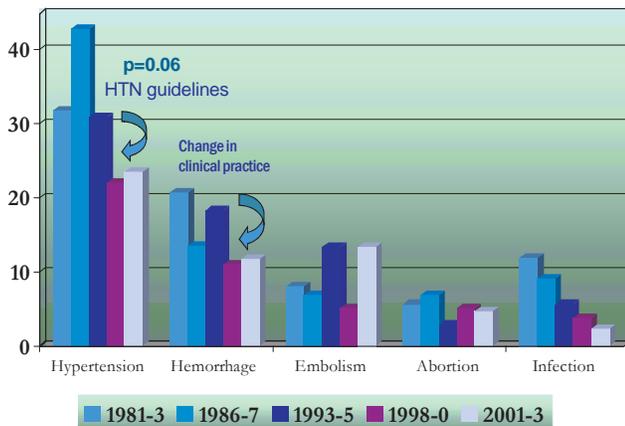


Fig. 2: Trends in cause-specific direct maternal mortality, Jamaica: 1981–2003.

Indirect deaths - trends: 1981-2003

(ratios/100 000 live births in public hospitals: Jamaica)

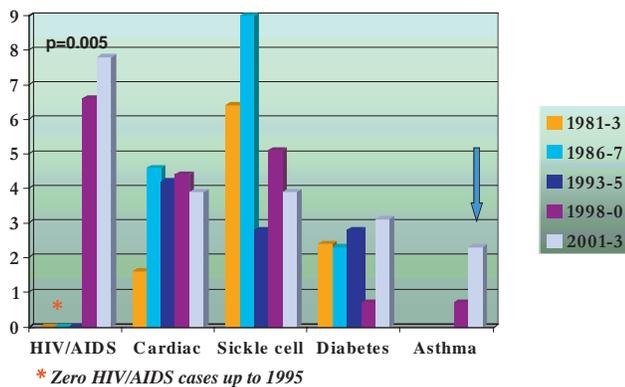


Fig. 3: Trends in cause-specific indirect maternal mortality: 1981–2003.

Maternal risk factors

Multiparous and older women are more likely to die from pregnancy complications and need special care during pregnancy, delivery and postnatally to mitigate the increasing risk of death. One highly modifiable risk factor that must be addressed is obesity. Most of the women who died from hypertension and all who died from heart disease and diabetes were obese.

Health service factors

Regional differences in maternal mortality: 1998–2003

Women in the western region of Jamaica enjoy a much lower risk of dying, especially from direct complications such as hypertension and haemorrhage. Employment of more obstetricians in the north-east resulted in a significant decline in mortality in that region.

Access to care and mortality risk: 1998–2003

Women who live in parishes with only a Type C hospital (deliveries attended by midwives supervised by a surgeon) were three times more likely to die from haemorrhage than women from parishes with obstetricians.

Obstetric complications with delays (%), by country

A four-country quality of care study found that compared to Benin, Ecuador and Rwanda, Jamaican women had to wait longer to be seen, particularly to get an initial evaluation and for their treatment to begin, with the wait for this initial evaluation longer on weekdays. It was not all bad however – as Jamaica recorded the shortest time from decision to incision for Caesarian-sections under similar staffing conditions, with similar team sizes across the four countries (20).

Maternal deaths: Jamaica – Vital registration (1998)

In 1998, we examined the registration of maternal deaths. Of 49 deaths, we found medical certificates for 36. Only 13 however were correctly classified as maternal deaths, yielding a mortality ratio of 29 per 100 000. If the 36 registered deaths had been correctly classified that would give a more credible 81, closer to the actual ratio of 110/100 000.

Global Reach

The work that we have done has led to international invitations from the Institute of Medicine of the National Academy of Sciences in the United States of America (USA) to provide advice on improving birth outcomes in developing countries (21–22) and to evaluate the President's Emergency Plan for AIDS Relief (23). We have also worked with WHO to help develop indicators of access to reproductive health and emergency obstetric care and to evaluate the WHO antenatal care trial (24).

Successes: The Developing World

The success of developing countries, such as Thailand, which moved their ratio from 100 to 18 in 15 years, may be instructive. The Thai government promotes research to investigate population health problems and develop solutions. In 1992, it established a Health Systems Research Institute to guide this process. It also has set up health promotion hospitals in each Health Region to test innovations prior to scale-up. Strategic quality indicators have been developed by the Ministry of Public Health. Community boards monitor achievement of these goals at the institutional and regional level. University Academics sit on these boards and can infuse evidence based methods into local policy. This creates an environment that allows health teams and academics to work together, including on research projects, and makes teams more responsive to evidence as they are part owners of the research process and its products.

Faculty of Medicine, Khon Kaen University, Thailand

Professor Pisake, director of the Clinical Epidemiology Unit at Khon Kaen University, runs a Cochrane Collaboration Research Centre which participates in many clinical trials, including the WHO antenatal care trial that I had the good fortune to evaluate (24). His Faculty of Medicine has a Research Results Utilization Committee to lead the transformation of research evidence into practice. Mona's Faculty of Medical Sciences needs to develop this kind of leadership potential.

Outstanding Questions

With our mortality ratio below 100, international funders are disinterested, so we await local funding to validate the 2004–6 surveillance findings and determine why only two of five maternal deaths show up in the vital statistics. We need clinical guidelines for the other complications of pregnancy and a model to get medical and obstetric teams working together to reduce the growing indirect deaths. We need to know why the western health region is different so that we can replicate their success. We need support to do the training.

Challenge

The challenge is who will fund the research which is still needed to inform the improvement of our indicators so that they approach developed nation status as we know Jamaica is capable of. Will industry, both public and private, provide fellowships, grants and soft loans so that these university research teams can investigate parochial problems and craft endemic solutions and lead this development process?

Reducing Maternal Deaths: Model for Development

Our model in which university faculty and postgraduate students collaborate with public health teams to investigate disease burden, find the most effective strategies and train public health teams is workable. However, as our public health indicators improve, our ability to get international grants shrinks. Professor Pisake reported that Thailand is now being asked to contribute to WHO. Will civil society, supported by government, fill that gap by endowing a research and training fund?

As slave masters of yore recognized, a healthy workforce is a productive one. Employed women control their fertility and contribute to greater wealth creation by investing in early stimulation, education and development of the next generation. Postgraduate students now take seven years to get a PhD while trying to eke out a living – is this productive use of potential energy? Fellowships would allow them to efficiently complete their training and enter industry earlier to lead the wealth creation process. The Planning Institute of Jamaica is charting Vision 2030 to guide Jamaica to developed world status by 2030. Like the Asian tigers, we must invest in our most abundant natural resource, our young people.

In summary, declines in direct deaths suggest a positive response to our monitoring and intervention activities (Figs. 1, 2), so the question is can Jamaica achieve the 5th MDG and reduce maternal deaths to 25/100 000 or less? Now that the University community has achieved the chronological age of senior citizens, we must apply the collective wisdom that comes with maturity to encourage more productive use of our initiative and creativity to meet our and the nation's development needs.

An undated citation from the UN Secretary-General sums up our development challenge adequately. "We will... reach the Millennium Development Goals – worldwide ... only if we break with business as usual. It takes time to train ... nurses and engineers; build ... schools and hospitals; ... create the jobs and income needed. We must start now."

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Dr Karen Lewis-Bell now carries the maternal health torch on Dr Ashley's retirement.

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