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Continued Work: Screening School Children for Congenital Heart Disease in Developing Countries

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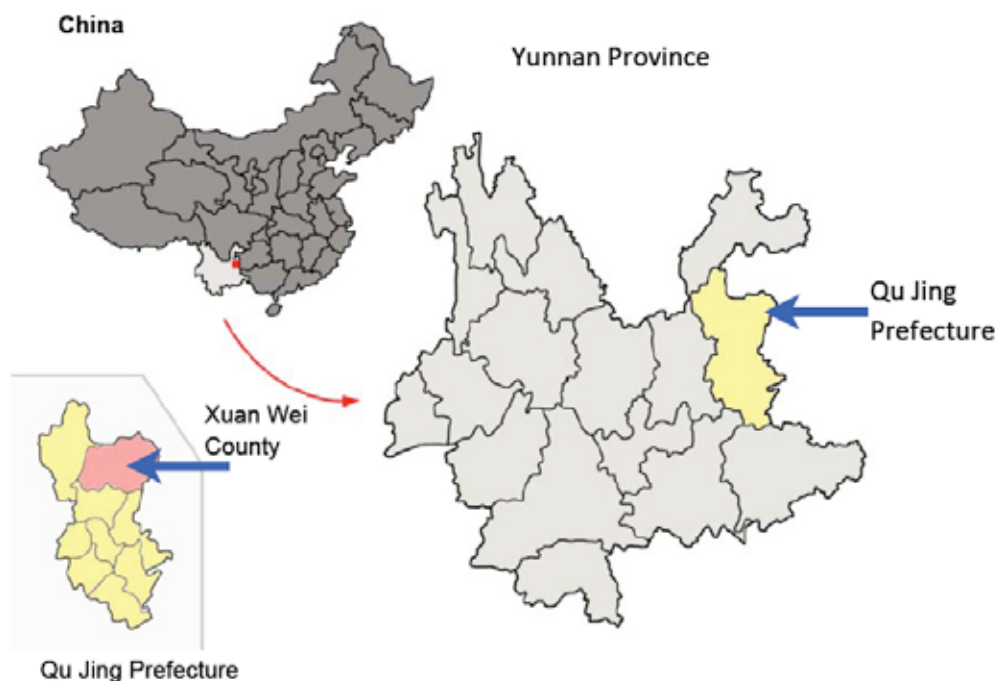
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Introduction

In developed nations, physicians are adequately trained and facilities are adequately equipped to screen all children for congenital heart disease at birth and during the first years of life. This is not true in countries that are developing. Since 2009, China California Heart Watch has been using a two-leveled method in rural Yunnan Province, China to identify, diagnose and provide treatment for children with congenital heart diseases. This method, first introduced and detailed in this journal¹ engages university student volunteers and local and foreign doctors to screen and diagnose children in Yunnan elementary schools. The method, since its initial introduction, has yielded promising and positive results. We present here results of our 2012 screening program in Xuan Wei County, Yunnan Province, China. See map for location of Xuan Wei County.

Background

Primary caregivers in rural Yunnan Province, China, are not sufficiently educated and consequently unaware of the methods of screening and diagnosing congenital heart diseases. As a result, children often do not receive proper and timely care and are diagnosed only after they have developed significant and irreversible pulmonary



vascular damage from chronic pulmonary hypertension. These children suffer their entire lives into adulthood; many die early deaths. In 2005, Jiang et al reported the results of surveying classroom children in rural Yunnan. Her team of cardiologists first trained local village doctors to recognize heart murmurs using stethoscopes without specificity—simply to be able to distinguish

between an absence of a murmur and the presence of one. Once a child had been identified as having a murmur, he or she would undergo a full examination by one of the cardiologists on site, including a cardiac ultrasound to determine the details of the defect(s). Using this two-leveled method, Dr. Jiang found a prevalence of congenital heart disease ranging from 2.75 to 17 per thousand



China Cal intern Elaine Hao screens child.



June 2013 China Cal interns.



Students lining up to be screened.

children in various counties, which is similar to that of developed nations. That is to say, using a team of cardiologists paired with village doctors that had been trained for a day, Dr. Jiang was able to detect the same prevalence of pediatric heart disease as that reported in developed nations. Additionally, the majority of the children diagnosed were unaware of their condition prior to these screenings and the majority of the village doctors were unaware of the proper use of a stethoscope before the training. China California Heart Watch applied this model to their congenital heart disease detection program in Yunnan Province.

Methods

Dr. Jiang inspired us to begin a similar screening program in Yunnan province using both Chinese and foreign undergraduate and medical students as screeners. Our training and screening procedure is as follows:

1. A group of between three and 27 undergraduate and medical student volunteers undergo one half-day of training, divided into two parts: proper use of a simple diaphragm stethoscope and recognition of heart murmurs using electronically recorded murmurs from children and adults. Emphasis is placed on sensitivity (detecting any murmur or abnormally split second sound), rather than on specificity (distinguishing physiologic from pathologic murmurs). Students are tested at the end of the training with ten recordings, three of which are normal. If a student incorrectly reports an abnormality as normal, he/she must repeat the training.
2. After training, students are brought to a local hospital, where they must auscultate the hearts of three or four pediatric or adult patients with heart disease and abnormal auscultatory findings.
3. Students travel with one to three cardiologists to impoverished rural towns where they live and work for 10 to 25 days.
4. Each day, a team of students under the supervision of a cardiologist (one

cardiologist to four students) screens classroom children for several hours. Two screeners work in the front of each classroom as the children march up, lift their upper garments and undergo auscultation at four auscultation points.

5. Any child with a heart murmur is referred to a supervising cardiologist. If the cardiologist deems the murmur to be pathologic, he/she with the help of students and nurses perform full exams, including history, physical exam, pulse oximetry, and cardiac ultrasound.
6. Families are notified and referrals are made if appropriate. China California Heart Watch provided grants to indigent families when surgeries were inadequately covered by local insurance.

Results

During 2012, China California Heart Watch volunteers screened all elementary school children in nine towns in Xuanwei county, Yunnan Province. In June 2012, there were a total of 14,731 schoolchildren screened, and our team identified 78 cases of CHD. In September 2012, 54 children out of 13,341 were identified. In December 2012, 52 children out of 27,206 were identified. In total, 184 cases of CHD were identified out of 55,278 schoolchildren in Xuan Wei County. The overall prevalence was 0.33%.

Conclusion

These results reflect favorably upon the continued use of this model in China and in other developing countries to identify and give aid to children in rural, impoverished areas who have congenital heart disease. Since 2011, when we introduced this model, we have consistently noted results that are similar to published prevalences in other parts of China and in developed nations, where children are screened at birth and in early childhood. This model has proven effective and accurate, and most importantly, efficient in that it requires minimal costs (volunteer students, local

Table			
Month	Children Screened	Cases Diagnosed	Crude Prevalence
June	14,731	78	0.52%
September	13,341	54	0.40%
December	27,206	52	0.19%

physicians and inexpensive stethoscopes). With these simple resources, it is possible to make a real and measurable difference in the lives of children who would have been otherwise overlooked.

References

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