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ORIGINAL ARTICLE

Kidney Mentoring and Assessment Program for Students: a guide for engaging medical students in nephrology

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ABSTRACT

Background. The American Society of Nephrology's (ASN) Workforce Committee created a unique program called the Kidney Mentoring and Awareness Program for Students to engage medical students in the fight against kidney diseases and interest them in careers in nephrology.

Methods. The program provided a framework and 2 years of funding to three medical schools to organize and carry out health screenings in underserved areas of their communities as well as a structure for student mentoring by the practicing nephrologists.

Results. The Workforce Committee identified three medical schools (Emory University, Atlanta, GA; Indiana University, Indianapolis, IN and University of Louisville, Louisville, KY) and engaged faculty at each school to serve as advisors. The ASN committed funding to the groups for 2 years, after which the groups became self-sufficient. Three nephrologists participated in each chapter, building on existing relationships with community groups to identify sites and carry out kidney screening events.

Conclusions. We report here the experience of those chapters and a blueprint for other schools interested in setting up a similarly structured program to interest students in nephrology while working with community groups to spread awareness of the major underlying causes of kidney disease.

Keywords: hypertension, obesity, public health, screening, type 2 diabetes

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INTRODUCTION

The demand for nephrologists to care for the growing burden of kidney diseases remains an area of great concern [1]. Disparities between the number of trainees entering nephrology and the jobs awaiting them upon completion of a fellowship have further complicated the efforts to encourage top trainees to go into nephrology [2]. All the while, the epidemic of noncommunicable diseases underlying much of chronic kidney disease—hypertension, diabetes and obesity, in particular—continues unabated [3, 4].

The American Society of Nephrology's (ASN) Workforce Committee, established to implement approaches to engage more trainees in nephrology, created the Kidney Mentoring and Assessment Program for Students (MAPS) to expose medical students to the link between the prevalence of diabetes and hypertension in underserved communities and access to health care. As envisioned, the Kidney MAPS sought to increase interest in nephrology by connecting Kidney MAPS participants with mentors to discuss mutual areas of interest.

This initial effort resulted in the creation of three chapters to serve as models to help other interested medical schools establish their own Kidney MAPS chapters. The concept of screening programs either as a way to engage students in a particular medical career path or bring them in contact with medically underserved communities is not novel. We present here a framework for holding medical screening events and some of the experiences and lessons learned by the inaugural partners since the program's inception as a guide to practicing nephrologists interested in setting up a chapter.

MAPS DEVELOPMENT

Kidney MAPS drew heavily on the concepts of the Kidney Disease Screening and Awareness Program (KDSAP) designed by Hsiao *et al.* at Brigham and Women's Hospital, Harvard Medical School [5]. Working with undergraduate students at Harvard College, Hsiao *et al.* saw a need for public health screenings in Boston's Chinatown. They first met with community leaders to assess the needs in the community, then they worked to establish training programs for student participants in universal precautions and patient interactions while simultaneously creating educational and mentorship activities. Funding came from college activity fees and administrative support for the program came from Brigham and Women's Hospital. The KDSAP subsequently established 13 chapters nationwide [6].

Working with the KDSAP, the ASN Workforce Committee's Kidney MAPS group developed requirements (Table 1) and a sample budget (Table 2) for the Kidney MAPS. A key feature of the KDSAP was the need for participants to train in techniques for measuring blood pressure, observing universal precautions and respecting patient privacy. The Kidney MAPS incorporated these elements into its program.

While the KDSAP focused on engaging college and high school students, the Kidney MAPS focused on engaging medical students in their first and second preclinical years. This approach was based on the impression that many medical students decide on careers in medicine in the first 2 years of medical school.

The Kidney MAPS stated its mission broadly as an effort 'to promote interest in careers in nephrology through student-organized and run outreach programs to identify people at risk for diabetes and hypertension in medically underserved communities, aided by practicing nephrologists who volunteer their time to help students – high school, college and medical school – understand the risk factors for chronic kidney disease and the increasing need for medical professionals to help combat it'.

Table 1. Recommendations for establishing a Kidney MAPS chapter

1. Become recognized/sanctioned by school as a student organization.
2. Seek faculty advisor/mentor who is a nephrologist.
3. Set training in organizing screenings or partner with an existing organization that already does community screenings.
4. Have chapter members complete Universal Precaution and Professionalism training, including modules on universal precautions, patient confidentiality (HIPPA), blood pressure, blood glucose and urinalysis before participating in a screening event. Successful completion of medical school doctoring and physical diagnosis courses could satisfy this requirement.
5. Commit to a set number of screenings per year (three or four) in underserved areas of the community. Identify community leaders and assess community needs and resources.
6. Help patients who screen positive but lack insurance or a doctor to receive follow-up care by establishing a relationship with a free or community health clinic.
7. Make certain you comply with state and local health codes to conduct screenings and perform laboratory testing before the first screening session.
8. Maintain records of each screening: number of people screened, blood pressure, blood glucose, urinalysis and body mass index results and follow-up plan.
9. Create an annual report on expenditures and activities.
10. Establish a mentorship program for students, including seminars on CKD, CKD risk factors (hypertension, diabetes, obesity) and the socioeconomic burden of kidney disease.
11. Help interested students connect with other clinicians and researchers in nephrology.
12. Promote interest in nephrology by encouraging participation in ASN programs (Kidney TREKS, Kidney Week); ASN will provide complimentary E-student memberships.
13. Establish contacts with other Kidney MAPS chapters.
14. Enjoy the learning opportunity while engaging in leading the fight against kidney disease.

Interested groups are encouraged to contact the three original Kidney MAPS chapters for more information about setting up a group and your medical school's renal division to seek out a mentor. Groups are also encouraged to get in touch with the local chapters of national organizations such as the NKF, the AKF and national student organizations such as the Student National Medical Association. HIPPA, Health Insurance Portability and Accountability Act.

PILOT CHAPTER IMPLEMENTATION

The ASN initially established three Kidney MAPS chapters (Emory University, Atlanta, GA; Indiana University, Indianapolis, IN and University of Louisville, Louisville, KY) with funding for 2 years and the understanding that each chapter would become financially self-sustaining after that period.

The start-up costs for the initial chapters were estimated to be $8650 for major equipment costs, including a urine analyzer ($1200), an administrative stipend ($1000) and a grant to the faculty advisor(s) ($1000).

Faculty advisors and students from the Atlanta, Indianapolis and Louisville sites underwent a 2-day workshop in Boston, MA,

Table 2. Sample estimated initial chapter budget

Administration and supplies	Unit/chapter	Cost per unit	Total
Organizational (club) cost			
Printing and stationery	20	$2.00	$40.00
Website	–	–	$180.00
Transportation	–	–	$450.00
Parking	–	–	$60.00
Miscellaneous	–	–	$120.00
Stipend for admininstrative assistant	–	–	$1000.00
Stipend for mentor	–	–	$1000.00
Miscellaneous promotional items	–	–	$500.00
Subtotal	–	–	$3350.00
Operational (screening) costs			
Equipment	–	–	–
Automatic sphygmomanometer (with medium and large cuffs)	4	$68.00	$272.00
Glucometer (OneTouch Ultra; with one backup)	4	$20.00	$80.00
Urinalysis machine	1		$1200.00
Disposable supplies (assumes four screenings/year)	–	–	–
4.5 oz specimen cup with screw cap (sterile)	400	$0.30	$120.00
Urinalysis strips (100/bottle)	4	$100.00	$400.00
Safe-T Pro Lancets (200/box)	3	$58.00	$174.00
Glucometer strips (100/box)	2	$172.00	$344.00
Gloves ($40/box)	42	$6.00	$252.00
Purell (bottle) 15 tables	20	$6.00	$120.00
Facial tissue (184/box) 15 tables	30	$2.50	$75.00
Bandage (60/box)	5	$3.40	$17.00
Gauge 2″ × 2″ (25/pack)	20	$4.50	$90.00
Alcohol prep (100/box)	15	$2.40	$36.00
Disposable table cloth (6/pack)	12	$10.00	$120.00
Other recurring costs (four screenings/year)			
Printing (flyers, forms, brochures, etc.) (color)	4	$200.00	$800.00
Food (based on 30 volunteers)	4	$250.00	$1000.00
Follow-up (letters/stamps, calls, etc.)	4	$50.00	$200.00
Subtotal	–	–	$5300.00
Total chapter costs	–	–	$8650.00

on 4–5 October 2013, including observing a KDSAP screening. The first Kidney MAPS screening was held in Atlanta on 14 November 2013, to coincide with ASN's Kidney Week and the American Kidney Fund's (AKF) Kidney Action Day.

The numbers of students participating and people screened in the first 2 years of the Kidney MAPS were small (61 students, 1235 people screened), with each chapter holding eight events per year. Limited demographic data showed that woman predominated as attendees (52–74%) and that attendees were largely middle-aged with roughly 34% ages 35–44 years and another 15% ages 45–54 years. The diversity of attendees reflected broader demographic trends. African Americans represented 90–100% at screenings in Georgia. African Americans made up 37.7% of screening participants in Louisville, followed by Hispanic/Latino participants at 21.3%. In Indiana, Hispanic/Latino participants accounted for 36% of attendees, whites 33% and African Americans 9%.

The organizational efforts and experience of each Kidney MAPS chapter extend beyond the data collected. At Emory, faculty mentors recruited students through Emory's chapter of the Institute for Healthcare Improvement and its Summer Undergraduate Program in Renal Research. This program, funded by the US National Institutes of Health, offers opportunities to students to engage in meaningful kidney research that complements their clinical experience in the Kidney MAPS. In addition to partnering with the AKF for the inaugural Kidney MAPS event in Atlanta, the Emory chapter carried out medical missions to an underserved community in Edison, GA. Students and internal medicine residents have joined mentors on rounds in the hospital to shadow and experience the inpatient nephrology service. The chapter also organized question-and-answer sessions with medical students, discussing nephrology as a career option. Students and an internal medicine resident were involved with clinical research and manuscript production as they apply for medical school and nephrology fellowships, respectively. The chapter at Emory had an annual schedule with four screenings and one summer mentoring event planned.

At Indiana University (IU), the Kidney MAPS chapter formed a partnership with the Indiana chapter of the National Kidney Foundation (NKF-I), which already had a successful CKD screening program in place. The Indiana University Kidney MAPS chapter was able to utilize NKF-I's existing resources, infrastructure and established partnerships within the underserved patient population of Indianapolis. This reduced costs and shortened the timeline for starting operations and increased student engagement and time for other mentoring activities. As Students for the Prevention of Kidney Diseases (SPKD) (SPKD; Spkd@iupui.edu), they partnered with the Minority Health Coalition to hold the 'Too Sweet Diabetes Conference'. SPKD has also held a joint meeting with the medical school's pediatrics interest group.

Mentoring activities included conferences for Kidney MAPS chapter members and interested IU medical students on topics

Table 3. Kidney MAPS contacts

Emory University—Jason Cobb, MD (jcobb2@emory.edu)
Indiana University—Richard Hellman, MD (rhellman@iu.edu)
University of Louisville—Nina Vasavada, MD (nina.panchal@louisville.edu) or Lina Mackelaite, MD (10Mack01@exchange.Louisville.edu)

that included diagnosis and treatment of CKD and the ethical dimensions of providing hemodialysis to undocumented patients. IU mentors used the conferences as a way to increase awareness of nephrology as a career choice and a venue for recruiting new chapter members. They also recruited chapter members through the medical school's Office of Medical Service Learning.

The Kidney MAPS chapter at the University of Louisville sought to reach medically underserved individuals through collaboration with a variety of local organizations, including the University of Louisville Infectious Disease Division, Americana Family Health Center and Elderserve, Inc. From these partnerships, diverse populations are screened, including refugees, uninsured immigrants and low-income elderly individuals.

In addition to the health screening events, Louisville's faculty hosted an annual interactive luncheon with medical students, using a speed networking format. Medical students rotate through groups of faculty representing different disciplines of nephrology (general nephrology, transplant, interventional and research) and engage in small group conversations about professional topics. From these networking events, medical students have been recruited for summer research projects and clinical electives, as well as given positive feedback about the breadth of nephrology opportunities.

After the initial financial support by ASN, subsequent program support has been through internal division funds. These efforts have led to a number of positive outcomes. Several of the medically underserved screening participants have followed up with the faculty practice and now receive ongoing nephrology care. Community partners have expressed enthusiasm in working with medical students and seek planning for future events. Medical students have further developed skills in leadership and organization.

The ASN partnered with the AKF and several medical schools in Philadelphia to hold screenings in conjunction with ASN Kidney Week 2014. These screenings, organized by the Lewis Katz School of Medicine at Temple University, took place in five ACME grocery stores and the Salvation Army Kroc Center.

The ASN provided administrative support and budgeted funding for the three sites at $10 000 each in 2013–14 and 2015, with the understanding that the chapters would become financially self-sufficient after 2 years. Since then the programs have become self-sufficient. In some cases, faculty have paid for incidental costs out of pocket, but those costs were low because the biggest cost, food, as well as event space and advertising, were covered by the local cosponsors of the screenings.

The ASN hoped the successes of the three vanguard Kidney MAPS chapters could be replicated throughout the country at the grass-roots level with local resources and placed the name Kidney MAPS and organizational material (guiding principles, sample budget, universal precautions presentation) in the public domain for anyone interested in setting up a Kidney MAPS chapter. The original three chapters agreed to serve as model programs for any group seeking guidance on setting up a chapter and providing screenings in underserved areas (Table 3) while continuing their activities with the new screening events. Kidney MAPS participants are encouraged to apply to the two other initiatives of ASN for students and trainees, Kidney Tutored Research and Education for Kidney Students (TREKS) [7] and Kidney Students and Residents at Kidney Week.

DISCUSSION

The data on using community health screening experiences to encourage medical students to choose a particular specialty or subspecialty are scarce. Much of the focus is on encouraging students to go into rural medicine and primary care, shedding some light on how successful community programs may be in recruiting students into a particular field. At the same time, data on the outcomes of formal mentoring programs are limited in part by the disparate goals established by different models. Literature about the usefulness of screenings concentrates on the benefits to the populations screened.

In Ghana, where medical students spend time on required rotations at rural health centers, researchers interviewed the trainees about whether their experience in community-based education and service models influenced their decision to go into rural medicine. While 44% of respondents said the postings in rural district hospitals would not influence their decision, 45% said they would. Men and women were equally represented [8].

Government-funded rural health clubs were set up in the 1990s to encourage medical, nursing and allied health students to go into careers in rural health in Australia. The student-run clubs, part of a National Rural Health Network, allowed students to experience rural medicine through trips to rural locations, provided scholarship information and held practical workshops. But while the authors of a review of the National Rural Health Network cited anecdotal evidence to support its success in encouraging careers in rural health, they cited no formal evidence on which to base their conclusion [9].

Researchers looked retrospectively at whether participation in a student-run free clinic in Tennessee had any effect on academic achievement and selection of primary care as a specialty. Roughly 20% of the classes of 2008–12 (141 of 689) volunteered time in the clinic. Compared with their classmates who did not volunteer, participants in the free clinic had higher grade point averages and achieved higher scores on the U.S. Medical Licensing Examination Step 1 and Step 2 clinical knowledge. But there was no difference in the selection of primary care as a career choice [10]. The authors of this study noted that at their public medical school, roughly half the class usually went into primary care.

Other authors have looked at the role of medical students in community outreach efforts as part of a general medical education. First- and second-year medical students at the Pennsylvania State University College of Medicine organize and carry out a program to teach and mentor secondary school students in a structured curriculum aimed at promoting interest in health and medical careers. While not quantified, the authors suggested the value of such a program to the medical students included the increased ability to explain complex subjects in clear terms that can be easily understood by people not in medicine [11].

Separately, medical students at Penn State also had the opportunity to participate in a community outreach program to teach families about the benefits of fresh fruits and vegetables in diets as a way to help combat obesity. While the students commented on the skills learned as mentors, they noted that

they could have benefited from more structured training and communication with a registered dietician [12], suggesting the importance of combining service and instruction in such programs.

Conceptually, the Kidney MAPS fits in with established education models. Frei *et al.* [13] reviewed the literature on mentoring as they sought to build a formal mentoring program in the medical school at Zurich University. Among the established program models they outlined were those that aimed at fostering interest in certain careers and developing professionalism and personal growth. Mentoring models included small group and individual mentoring.

Similarly, the geographic distribution of Kidney MAPS chapters suggests that they have the potential to meet both a socioeconomic need for access to health care as well as provide medical students early contact in their careers with patients suffering from complex medical problems [14].

The Kidney MAPS uses some of the concepts outlined in the Chicago Barbershop trials, in that groups try to find out what best suits the needs of the community [15]. In the active arm of that trial, barbers encouraged customers to meet with pharmacists, who prescribed antihypertensive medications in conjunction with the individual's doctor. While a pharmacist could certainly participate in the Kidney MAPS, screenings are aimed at identifying individuals at risk, not treatment.

Over time, established community screenings have the potential to reach large numbers of people. The NKF of Illinois, for example, screened >20 000 people between 2005 and 2011 at mobile community-based screenings [16]. At Emory, Kidney MAPS has concentrated its events mostly at churches, estimating that 95–100% of participants at most screenings are African American, and has held screenings with a local black physicians association and a black nurses association. The Kidney MAPS at IU used a historical connection with the NKF to hold events around the state (Evansville, Indianapolis and Terre Haute), screening ~50 at each event.

The Kidney MAPS also provides a way for practicing nephrologists to participate in the ASN's broader call for 'regular screening for kidney disease, regardless of an individual's risk factors', particularly in marginalized populations with poor access to health care and health insurance [17]. Screenings organized by the Kidney Foundation of Canada targeted specific populations (First Nations, South Asians, senior citizens) as part of its See Kidney Disease initiative [18].

There are limits on what mentoring programs can accomplish, including quantifying what can be accomplished by such programs. A survey of all 36 medical schools in Germany, for example, found that 22 of the 36 schools had established programs, but with diverse declared goals. Indeed, one of those goals, not discussed elsewhere in the literature, was the aim of improving academic performance. Funding for many of the programs comes from recently introduced tuition requirements [19].

The same authors had earlier described a two-tiered model of mentoring that they had established at their medical school, which included one-on-one mentoring in the clinical years and society-based peer mentoring in the preclinical years [20]. But given what they described as the complex construct of sociocultural, professional and psychological elements of mentoring, they noted in a 5-year review of their program that they could not conclude what kind of long-term impact it has had [21].

While the Kidney MAPS has elements that fit in squarely with established literature on mentoring programs for medical students, it is also unique in trying to respond to a particular professional need as part of a larger strategy. Efforts in nephrology have focused on ways to make rounds more educational [22] and to revise the traditional format of the inpatient consult service to include outpatient and transplant exposure [23, 24]. The KDSAP's early results suggest the potential for mentoring to influence career choices. In their initial follow-up of 51 KDSAP Harvard College graduates, 26 enrolled in medical school, 5 enrolled in public health programs and 5 were involved in health-related research. Two of the KDSAP graduates were doing internal medicine residencies and planned careers in nephrology [6]. One of the original Kidney MAPS participants at IU is starting a nephrology fellowship there (R. Hellman, personal communication). Students at Emory routinely cite their Kidney MAPS experience as part of their curricula vitae. The absence of positive mentoring is one reason why some physicians did not go into nephrology [25]. Individual Kidney MAPS chapters have demonstrated positive mentoring locally and can serve as models and mentors for future chapters. Measuring the effectiveness of mentoring remains one of the challenges for the Kidney MAPS in addition to funding and administering the logistics of screenings. More funding should be concentrated initially on giving faculty protected time to engage in mentoring and community outreach. Similarly, funding for initial administrative startup and ongoing activities was cited as a need. Still, despite the time commitment, faculty participants in the Kidney MAPS also saw it as an important part of their professional development (J. Cobb, personal communication).

Finally, we argue the Kidney MAPS specifically addresses concerns expressed in the recently signed executive order on improving efforts to prevent and treat kidney diseases. The order, signed 10 July, notes that US policy is to 'prevent kidney failure wherever possible through better diagnosis, treatment and incentives for preventative care' [26]. We think the Kidney MAPS can help put this policy into effect at the grass-roots level and could play an important part in advancing kidney health.

CONCLUSION

The Kidney MAPS seeks to interest medical students in careers in nephrology by engaging them in screenings in underserved communities to identify people with hypertension, diabetes and microalbuminuria and through mentoring by nephrologists in a medical school-based organization. It is too early to tell whether any participants in the Kidney MAPS will choose a career in nephrology, and there are no robust data to show that exposure to a patient population early in medical training influences career choice.

The Kidney MAPS offers a way for students to help in the fight against kidney diseases and develop mentoring relationships that may propel them into careers in nephrology. More experience with efforts such as the Kidney MAPS and KDSAP, as well as more data tracking the career paths of participants, are needed to show whether this could be a successful long-term strategy to train adequate numbers of nephrologists to meet future needs. And as the literature suggests, there may be benefits that go beyond the stated goals of the program that cannot be easily quantified, like professional satisfaction.

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CONFLICT OF INTEREST STATEMENT

None declared.

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