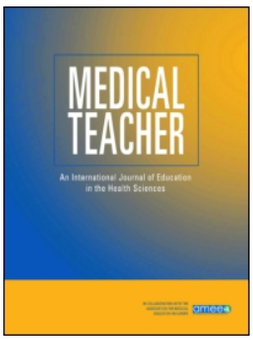

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AMEE GUIDE

Residents as teachers: Near peer learning in clinical work settings: AMEE Guide No. 106

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ABSTRACT

This AMEE Guide provides a framework to guide medical educators engaged in the design and implementation of "Resident as Teacher" programs. The suggested approaches are based on established models of program development: the Program Logic model to guide program design, the Dundee three-circle model to inform a systematic approach to planning educational content and the Kirkpatrick pyramid, which forms the backbone of program evaluation. The Guide provides an overview of Resident as Teacher curricula, their benefits and impact, from existing literature supplemented by insights from the authors' own experiences, all of whom are engaged in teaching initiatives at their own institutions. A conceptual description of the Program Logic model is provided, a model that highlights an outcomes-based curricular design. Examples of activities under each step of this model are described, which would allow educational leaders to structure their own program based on the scope, context, institutional needs and resources available. Emphasis is placed on a modular curricular format to not only enhance the teaching skills of residents, but also enable development of future career educators, scholars and leaders. Application of the Dundee three-circle model is illustrated to allow for a flexible curricular design that can cater to varying levels of educational needs and interests. In addition, practical advice is provided on robust assessment of outcomes, both assessment of participants and program evaluation. Finally, the authors highlight the need for congruence between the formal and hidden curriculum through explicit recognition of the value of teaching by institutions, support for development of teaching programs, encouragement of evidence-based approach to education and rewards for all levels of teachers.

Introduction

Doctors in training are increasingly encouraged to develop their roles as near-peer clinical teachers with mutual benefit for themselves and their learners. Near-peer teachers are neither professional educators nor experts in a given field; they teach their peers or junior learners while they themselves continue to learn (Ross & Cameron 2007). In many institutions worldwide, medical students spend more time with residents than faculty during their clinical rotations, with surveys indicating that they see residents as their most important and memorable clinical teachers (Remmen et al. 2000; Morrison et al. 2001; Aba Alkhail 2015). It is estimated that residents spend a quarter of their time teaching students and peers, regardless of their future career goals, and value this role greatly (Busari et al. 2002; Busari & Scherpbier 2004; Ogburn et al. 2005; Qureshi et al. 2013; Thampy et al. 2014).

Regulatory bodies internationally include teaching and supervision of peers and students as an essential competency for junior doctors (Royal College of Physicians and Surgeons of Canada 2005; General Medical Council 2013; Accreditation Council for Graduate Medical Education 2014; Australian Medical Council 2015; Committee on Accreditation of Canadian Medical Schools 2015; Liaison Committee on Medical Education 2015). Time constraints and increasing faculty obligations continue to increase the need for near-peer teaching (Parry et al. 2008; Polan 2010; Polan & Riba 2010). Many senior doctors also believe that teaching is an essential skill for residents and institutions should highlight the value of teaching overall and implement Resident as Teacher (RaT) programs (Busari et al. 2003).

Despite the perceived importance of residents' teaching roles, they may not receive adequate formal training in teaching skills (Bing-You & Tooker 1993), and many

Practice points

- Residents play a key role in the clinical education of peers and junior learners.
- Numerous individual and institutional benefits of "Resident as Teacher" programs have been described.
- "Resident as Teacher" programs vary from a single workshop to a longitudinal program of education.
- Application of a framework such as the Program Logic model ensures a focus on educational outcomes.
- A modular program design helps tailor the content to varying learning needs and career interests.
- Program leaders should consider the needs of institutions and residents, available resources and local context in design and implementation.
- The informal and hidden curriculum communicated by the institutional culture should match the formal curriculum of teaching initiatives.

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residents desire training in teaching skills (Busari et al. 2002; Thampy 2013). Teaching ability does not correlate with clinical competence; without formal preparation, residents are likely to adopt ineffective teaching strategies (Morrison & Hafler 2000). Benefits of RaT programs include improved knowledge, clinical and mentoring skills, enthusiasm for teaching, learner-centred teaching and a better understanding of teaching and learning principles (Morrison & Hafler 2000; Morrison et al. 2005). Training also increases residents' preparedness to teach and improves their rating as teachers (Wipf et al. 1999; Furney et al. 2001; Morrison et al. 2004; Wamsley et al. 2004; Qureshi et al. 2013; Wachtel et al. 2013; de Villiers et al. 2014). However, as the workload of residents increases along with duty hour restrictions, enjoyment of teaching decreases; busy residents rank teaching as a lower priority than competing clinical needs (Yedidia et al. 1995; Morrison et al. 2005; Thampy et al. 2013; de Villiers et al. 2014).

Implementation of formal programs in teaching for medical students and postgraduate trainees is increasing worldwide (Drouin et al., 2006; Durning & ten Cate 2007; ten Cate & Durning 2007b; Tolsgaard et al. 2007; ten Cate 2007; Hill et al. 2009; Post et al., 2009; de Villiers et al., 2014). In the USA alone, over 50% of residency programs have some form of RaT training. Programs vary widely in content, duration and format and are mostly based on teaching attributes deemed essential for faculty teachers (Morrison et al. 2001; Post et al. 2009; Karani et al. 2014). However, it is less clear whether institutions adopt an organized approach to design, implementation and evaluation of these programs or use a longitudinal approach to observing and mentoring residents during their teaching (Zabar et al. 2004; Mann et al. 2007). It is also rare that RaT programs are able to meet varying educational needs of residents; from those who wish to acquire basic teaching skills to those considering a career in medical education, i.e. context specificity (Lacasse & Ratnapalan 2009).

The purpose of this Guide

The primary aim of this Guide is to assist educational leaders in developing and implementing RaT programs. To help educators, we have drawn on three existing frameworks: the Kellogg Program Logic model to guide all steps of program design and prioritize outcomes evaluation (Kellogg 2004); the Dundee three-circle model (Harden et al. 1999), which can be applied to development of educational content; and the Kirkpatrick pyramid (Kirkpatrick 1994), a well-established model for program evaluation. It should be emphasized that a thorough needs assessment precedes curriculum design. These models and how they intersect are depicted in Figure 1. Educators will be able to develop their program targeted to their own institutional culture, needs, context and availability of resources.

Definitions

For the purposes of this Guide, the term "residents" encompasses all junior doctors who do not have an appointment at staff physician, consultant or attending physician level and includes residents, clinical fellows and junior doctors (foundation trainees + specialty trainees) (Wamsley et al. 2004; Bensinger et al. 2005; Fromme et al. 2011). The term "near-peer teachers" is also applicable to residents, thus near-peer teaching curricula pertaining to resident/fellow/junior doctor/house officer/registrar levels will be included. This Guide focuses on preparing residents to be clinical teachers in their everyday workplace – wards, clinics, conference rooms, corridor discussions and field trips to other specialities such as laboratory and imaging venues.

An important secondary goal is to encourage residents to aspire to future medical educator and educational leadership roles. It must also be acknowledged that clinical teaching can be formal and informal and includes mentoring, advising, coaching, facilitation of learning, providing resources as well as role-modeling, a vital aspect of on-the-job learning (Harden & Crosby 2000).

Importance of residents as teachers in the clinical environment

The potential impact of residents as teachers (positive and negative) can be summarized at all levels of Kirkpatrick's hierarchy (Kirkpatrick 1994).

Level 1: Reaction

Teaching can enhance residents' self-efficacy and improve overall job satisfaction (Sheets et al. 1991; Busari et al. 2000; Morrison et al. 2005; Dunne et al. 2011), as long as time and training are provided (Bing-You and Harvey 1991; Busari et al. 2002; Halestrap & Leeder 2011; Thampy et al. 2013). Residents believe they are well suited to teach their juniors (Busari et al. 2000, 2002), but report that their teaching role is not adequately emphasized or valued by their institution (Bing-You & Harvey 1991; Rotenberg et al. 2000).

Learners may value resident teaching higher than faculty teaching (Whittaker et al. 2006); students view residents as more approachable, which enables them to admit ignorance and mistakes and more readily accept constructive feedback (Tolsgaard et al. 2007; Ross & Cameron 2007; Rodrigues et al. 2009). Near-peer teaching has roots in social constructivism with knowledge actively constructed through social interactions occurring in an educational environment (ten Cate & Durning 2007a, 2007b). Cognitive congruence is enhanced as near-peer teachers may better understand learner needs and therefore deliver teaching at an appropriate level (Leeper et al. 2007; ten Cate and Durning 2007a; Lockspeiser et al. 2008; Hudson & Tonkin 2008; Nelson et al. 2013; Silberberg et al. 2013; Thampy et al. 2013; Ince-Cushman et al. 2015). Near-peer teachers are also more socially congruent to their learners by being closer in age and stage (Lockspeiser et al. 2008).

Teaching can, however, be perceived as additional and burdensome work (Thampy et al. 2013; de Villiers et al. 2014). Residents have stated that teaching can delay completion of clinical duties, and many struggle with juggling the roles of being frontline clinicians, learners as well as teachers (Yedidia et al. 1995). Being trainees themselves adds to a sense of insecurity as teachers; however, it appears that confidence in teaching grows as their clinical knowledge deepens (Greenberg et al. 1984).

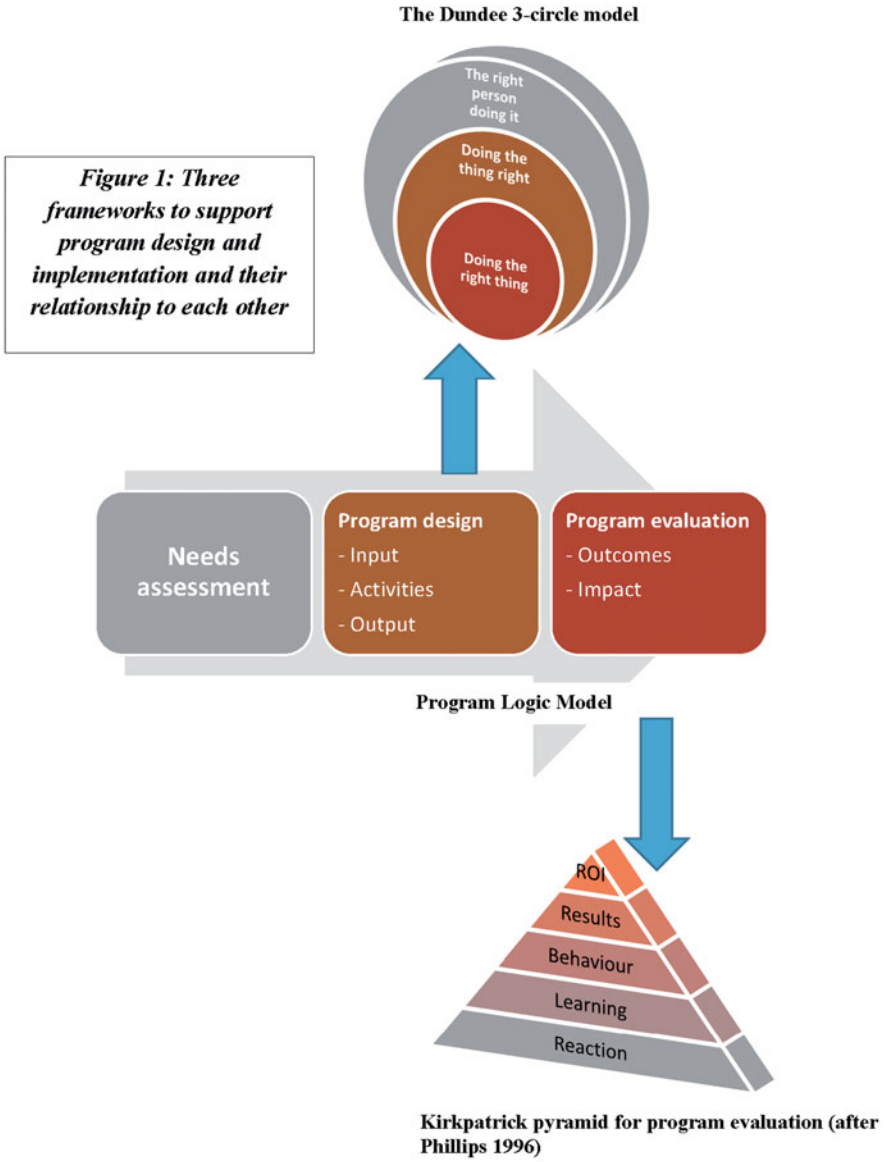

Figure 1: Three frameworks to support program design and implementation and their relationship to each other

Figure 1. Three frameworks to support program design and implementation and their relationship to each other.

Level 2: Learning

Preparing for teaching is itself a powerful driver of learning as it involves a process of organization of ideas, prioritization, reflection and linking of ideas and concepts. Residents who teach clinical topics to others are more likely to retain this knowledge than those who learn through lectures (Weiss & Needlman 1998). Residents have reported that teaching improves their own clinical skills (Bing-You & Harvey 1991; Post et al. 2009; Qureshi et al. 2013; de Villiers et al. 2014) and stimulates critical self-reflection (Busari et al. 2002). Other studies, however, failed to identify objective evidence of correlations between residents' teaching involvement and their academic performance (Seely et al. 1999; Morrison et al. 2000; Busari and Scherpbier 2004).

Level 3: Behaviour

Residents who have participated in RaT programs demonstrate improved teaching behaviours on assessments, such as objective structured teaching evaluations (OSTEs) (Morrison et al. 2004; Gaba et al. 2007) and report improved confidence in teaching (Spickard et al. 1996). Residents not only teach knowledge and skills but also serve as important role models of professional attributes and work ethic (Stern 1998; Bordley & Litzelman 2000). This aspect should be explicitly discussed during RaT courses (Blanco et al. 2013). To avoid role modeling of negative behaviours, there is value in monitoring the teaching of residents through direct observation or videotaping of teaching followed by feedback (Wilson 2007; Snydman et al. 2013). Residents who teach are likely to adopt good clinical practice by virtue of being observed (Snell 2011; Qureshi et al. 2013). Furthermore, residents who participate in RaT programs also appear to acquire other skills such as time management, efficiency and leadership (Vu et al. 1997; Wipf et al. 1999).

Level 4: Results

It has been suggested that more attention be paid to outcomes such as improved knowledge and skills of learners taught by residents (Gross 2000). Surgical residents are perceived by students to be better teachers of procedural skills and basic surgical principles than attending surgeons

(Pelletier & Belliveau 1999). Residents possibly use short, logical and sequential steps in clinical problem solving, which students can follow more easily, and use similar frameworks in future cases (Bordage & Lemieux 1991). Struggling students may be better identified by, and more closely supervized by residents (Daniels-Brady & Rieder 2010). However, objective evidence of direct impact of resident teaching on learner performance remains elusive (Stern et al. 2000; Langenfeld et al. 2011).

It has been suggested that involvement with teaching may promote better patient care (Steward & Feltovich 1988). In one study, skilled teachers were more likely to be perceived by their learners to be competent clinicians, but objective evidence of their competence is lacking (Busari & Scherpbier 2004).

Investing effort in RaT programs could reap other long-term benefits. Residents who participate in teaching skills training may be more likely to take on future teaching faculty roles and share their enthusiasm, knowledge and skills with their junior learners (Pristach et al. 1991). Some institutions have rewarded residents with formal teaching appointments as recognition of their educational credentials (Ning et al. 2009; McBride & Drake 2011). Residents can also influence students' career choice (Whittaker et al. 2006; Musunuru et al. 2007) through improved perceptions of that specialty (Ogburn et al. 2005; Johnson & Chen 2006).

Level 5: Return on investment

We present a less commonly included fifth level of the Kirkpatrick pyramid for institutions to consider (Figure 1), i.e. whether their investment in the teaching program has produced a return on investment (Phillips 1996). For example, a higher percentage of residents completing dedicated clinician educator tracks have taken on academic faculty posts and engaged in designing teaching programs (Jibson et al. 2010). Stakeholders might choose to discontinue programs or elements of a program that do not demonstrate significant benefits in the long run. This is harder to measure as it requires long-term follow-up, but needs to be addressed by institutional leadership. Box 1 summarizes the potential benefits of Resident as Teacher programs.

Box 1. Potential benefits of Resident as Teacher programs.

- **For residents**
- Development and improvement in teaching skills.
- Enhanced self-efficacy and identity as a teacher.
- Improved ability to assess and provide feedback to learners.
- Interest in education as a career focus.
- **For learners (peers and students)**
- Satisfaction with near-peer learning.
- Ability to better understand clinical reasoning.
- Improvement in clinical and patient care skills.
- Increased willingness to admit deficiencies.
- Increased receptivity to feedback.
- Cognitive congruence.
- Social congruence.
- **For institutions**
- Demonstrating recognition of value of teaching.
- Forming a community of educators (faculty and trainees).
- Developing future educational leaders.
- Creating an educational culture that values teaching and encourages an evidence-based approach to teaching and learning.
- Reputation for educational scholarship.
- **Patient care outcomes** – this is the ultimate goal and presently needs more research.

A suggested framework for program design: The Program Logic model

Designing programs requires a systematic and scholarly approach informed by existing evidence and best practices. The Program Logic model, a concept introduced by the W.K. Kellogg Foundation, prioritizes program outcomes over activities, and can guide effective program planning, implementation and evaluation (Kellogg 2004). In this model, educators describe each step of their project, assess resources needed, create timelines, make decisions on stepwise or full implementation, link outcomes (both short- and long-term) with program activities, evaluate program impact and calibrate whether goals are being met. It also provides a shared vision for program leaders, faculty and administrative staff. The model has been successfully applied to program development in various spheres including healthcare, health professions education and quality improvement and consists of two key steps: planned work and intended results.

Planned work

This phase consists of two steps: inputs and activities.

1. Inputs: These refer to the resources available for program design, implementation and evaluation, including funding, administrative personnel, faculty leadership, space, educational resources, media support, volunteer faculty, invited experts, consultants, equipment and the curriculum itself.
2. Activities: These refer to interventions designed to bring about intended results and include processes (developing curricula, teaching, mentoring, research, field trips, workplace teaching), tools (didactics, workshops, observation of teaching sessions, observation during their teaching sessions, feedback), technology, etc. The types of educational sessions, educational strategies, selection of required teachers, and research and scholarship requirements constitute examples of activities.

Intended results

This phase consists of two steps: outputs and outcomes.

1. Outputs: They are the direct products of activities and include details such as the length of the program, number of didactic sessions, number of workshops,

frequency of field trips to other educational institutions, number of participants, number of teachers, etc.
2. Outcomes: These relate to the benefits of the program and can be short term (1–3 years) or long term (4–6 years). Short-term outcomes are easier to measure as it is challenging to track long-term outcomes when participants may have left the institution. Examples of outcomes include changes in participants' knowledge, skills, behaviour and attitudes as well as academic achievements (leadership roles, publications, presentations, etc.

Impact

This refers to changes occurring in organizations, communities or systems as a result of program activities within 7–10 years. On-going program evaluation and revisions are essential to improve future program design and to establish an infrastructure to monitor, manage and report program outcomes throughout development and implementation.

Application of the framework to educational programs

This model can assist educators in three critical phases of new program development.

Program design: The program leader defines overall goals and objectives, assembles an effective team, develops an implementation strategy and explains clearly to stakeholders the need for the program, principles and approach. Shared understanding by all team members is crucial. Planners should be aware of existing best practices, evidence of their impact and understand their effectiveness or feasibility.
Program implementation: As application of the logic model necessitates achieving and documenting results, educators need to identify types of data needed to monitor and improve the program and data collection methods.
Program evaluation: The model presents program information and progress towards goals in ways that inform, advocate for a particular approach and communicate clearly with stakeholders.

Educational context and setting

The principles of the Program Logic model apply to development of a variety of programs, both educational and non-educational. However, the different workplace settings in which residents train and work need to be factored into program design. Training programs can be as small as a few trainees or as large as over 100 trainees; they can be located in urban, semi-urban or rural settings; they may be university affiliated or not; the training may occur mainly at a central location with some rotations at smaller, community sites or training may rotate through multiple locations with very different priorities.

Residents typically view their teaching role as educating junior learners and are slow to recognize that their teaching may be benefitting peers and those senior to them (Thampy et al. 2014). They may have multiple levels of junior learners working alongside them and in some countries serve as the leader of a trainee team. They are supervized by staff physicians who are expected not only to teach clinical medicine and supervize patient care, but also train residents to teach, manage and lead teams.

In many postgraduate training programs, the teaching role of residents is not explicit. Even if they are not expected to provide formal teaching to medical students, medical schools frequently assign students to clinical rotations as observers. Students "shadow" residents observing them during their patient care duties, tacitly acquiring knowledge and skills and absorbing good and bad habits.

What are the goals and objectives?

The goals and objectives of RaT programs can be considered from several perspectives. Although the primary goals are the educational outcomes for the residents, there are goals for other stakeholders. We have included below goals for residents as teachers; faculty leading the program; the program within which the residents are training and the institution. This section is intended to serve as a helpful template, but educators should develop specific goals and objectives relevant to their vision and consistent with local institutional needs.

For residents as teachers

The goals and expected outcomes for the residents include short-term outcomes related to their on-going development as a teacher (Harden & Crosby 2000) as well as their career development. They might include:

- Acquiring practical skills and knowledge about teaching and learning that can be applied in their teaching roles.
- Applying the evidence and principles that underlie effective approaches to teaching and learning.
- Reflecting on their educational role during residency as well as with a view to the role of education in their future careers.
- Acquisition of leadership skills essential for those interested in future educational leadership roles.

For faculty leading these initiatives

Faculty involvement in RaT programs may vary from a leadership role to participation in an aspect of the teaching. Although not always explicit, some goals for faculty might include the ability to contribute to:

- Building educational capacity in their institution, department, etc.
- Creating a positive learning culture for all learners and the department or institution.
- Building residents' professional identity as teachers.

For the graduate or postgraduate program

Depending on the institution, the RaT program may be offered within a specific department, or across multiple

departments. Goals to consider may include the opportunity to develop:

- A culture of effective education within the program.
- Clinical role-models for students leading to improved perceptions of a given speciality.
- Leaders in the residency program who can directly and indirectly influence others in providing effective teaching to peers, junior peers, other team members and students.
- Capacity to identify and develop future leaders in education.

For the institution

Institutions are increasingly called upon to respond to changes in health care delivery and provide effective learning opportunities for their learners of all professions. Aligned with these responsibilities, goals for the institution might include the opportunity to:

- Build capacity in education and alleviate the increasing competing demands placed on senior faculty.
- Enhance learners' experience through utilizing a range of clinical teachers at differing stages, better utilizing the benefits gained through resident near-peer teaching.
- Foster a culture of effective clinical education that leads to effective patient care. Such a culture would include emphasis on skills such as working on inter-professional teams, willingness to learn from all levels of learners within and outside their own profession.

Needs assessment

The most important role of the needs assessment is to guide program development. For educational interventions, the evidence gained from the needs assessment will also persuade the institution, the teacher and the learner to invest their time and energy (Norman et al. 2004). Needs assessment should be viewed from the perspective of multiple stakeholders and not just the recipients of the intervention. For RaT programs, stakeholders include: clinical service providers, undergraduate schools, postgraduate training programs, students, residents and accreditation bodies.

In a review of adult learning theories, Taylor and Hamdy demonstrated the crucial role of dissonance (when current experience does not match with an ideal) in driving the learning cycle (Taylor & Hamdy 2013) (Figure 2). For instance, observation of the teaching behaviours of a group of residents might lead to the decision to design a program focussed on addressing identified weaknesses (Katz et al. 2003).

Program design

The next stages include considering the range of approaches for the potential delivery of such a program (elaboration), designing the program to deliver the required outcomes (organization), program delivery and program evaluation to ensure that the program has the desired results. The program leadership will only be able to operate within the realm of what they know regarding the educational needs and likely to miss other needs that may be "unknown unknowns" (Luft & Ingham 1955). Working in teams with a wide range of experience (and hence a greater range of "knowns"), and optimizing the application of published standards (Royal College of Physicians and Surgeons of Canada 2005; General Medical Council 2012) and models (Harden et al. 1999) can minimize the unknowns. The inclusion of a member of the target audience, in this case, the residents, also provides an important perspective.

The needs assessment should include not only organizational and personal needs, but also needs of the community and the profession. It follows that the organization and the teaching team need to discuss and understand the implications of the needs assessment, to be shared with the participants. A training program has the potential to deliver far more than knowledge and skills.

Input/resources

Program leader and leadership team

There needs to be clearly appointed leadership for the program. The leaders play an important role in design and implementation and need sufficient time in their schedules to do the job effectively. The leader needs support and interest from both potential participants and teachers, as well as from institutional leaders. Credibility in residents' eyes is critical among the characteristics that influence residents' learning in clinical settings (Watling et al. 2012).

Program team

Effective RaT programs are designed, implemented and evaluated by a team. This team can be small, including the educational leaders, and a coordinator or other support for planning and logistics. The team is responsible for planning the curriculum, recruiting participants, arranging course evaluations, facilities, etc.

Resources

Depending on the nature of the program, this will involve recruiting a variety of teachers; some examples are listed below:

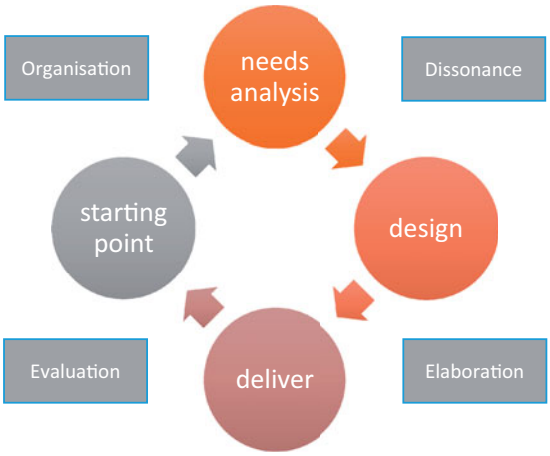

Figure 2. Needs assessment as an essential element in the learning cycle (after Taylor & Hamdy 2013).

- Core faculty – who work with the leadership team in program design, monitoring and engaged in teaching several sessions.
- Guest faculty – who may be invited to teach specific sessions based on their expertise in a given area.
- Faculty for assessment of residents – if a program decides to conduct formal assessment of residents' teaching skills (such as OSTE), evaluators would be needed.
- Faculty observers – some faculty who cannot offer the time for formal teaching may be willing to have residents accompany them on their rounds or clinical teaching sessions. This allows residents to serve as co-teachers and receive feedback on their teaching skills at the end of these sessions.

Follow-up

An important aspect of RaT programs, about which there is little written to date, is the inclusion of follow-up activities to enhance the likelihood of residents being able to transfer their new skills and knowledge to the workplace. As follow-up or "spacing" of activities is shown to enhance retention (Matzie et al. 2009; Dunlosky et al. 2013; Minter 2013; Pernar et al. 2013), this is a desirable aspect of RaT programs. Consideration must be given in advance to the resources that would be required to implement this follow-up.

Management for quality

Oversight and maintenance of a program are essential in the cycle of planning and evaluation. Program leaders should anticipate short-term adjustments and conduct formal program evaluation (as discussed below) following each iteration to enable on-going improvements.

Activities

The next step is to design program content and activities based on learning needs. Activities include designing the curriculum, selecting educational strategies, recruiting teachers, establishing mentoring procedures, developing assessment methods, deciding scholarship requirements, etc. The needs will drive the content of the program, but in all contexts the planning team could consider the "three-circle" model propounded by Harden and colleagues (Harden et al. 1999; Figure 3). Each of the three elements is important, and needs forethought.

"Doing the right thing"

There are many definitions of what doctors as teachers are expected to do; (Royal College of Physicians and Surgeons of Canada 2005; General Medical Council 2013); all share the need for professionals to develop their own knowledge, skills and attitudes, and encourage and support such development in their juniors and colleagues. In the context of "residents as teachers" a useful list is one proposed by Harden and colleagues (Harden & Crosby 2000) that includes a range of skills and roles essential for clinical teachers (Figure 3). Although at first sight this list seems to include teaching responsibilities beyond what residents might need, the ad hoc nature of their teaching probably requires the full range of skills, which will also stand them in good stead in the future. Program leaders can also use professional standards such as those defined by the Academy of Medical Educators in the UK (2014), which inform frameworks adopted by regulatory organizations in the UK and North America. Even in the absence of a regulatory requirement to be trained in particular educational domains, it is helpful for individual planning teams to reflect on the relative need for each area to be addressed in local programs.

"Doing the thing right"

There are two elements to "doing it right". The first is to possess the basic tools of the trade such as skills of giving and receiving feedback, understanding the needs of the learner and having some insight into their learning challenges (Bernstein 2000; Meyer et al. 2010). The second is to have a reasonable grasp of the theory that underpins teaching and learning both generally (Taylor & Hamdy 2013) and in the workplace (Dornan et al. 2007; Durning and Artino 2011).

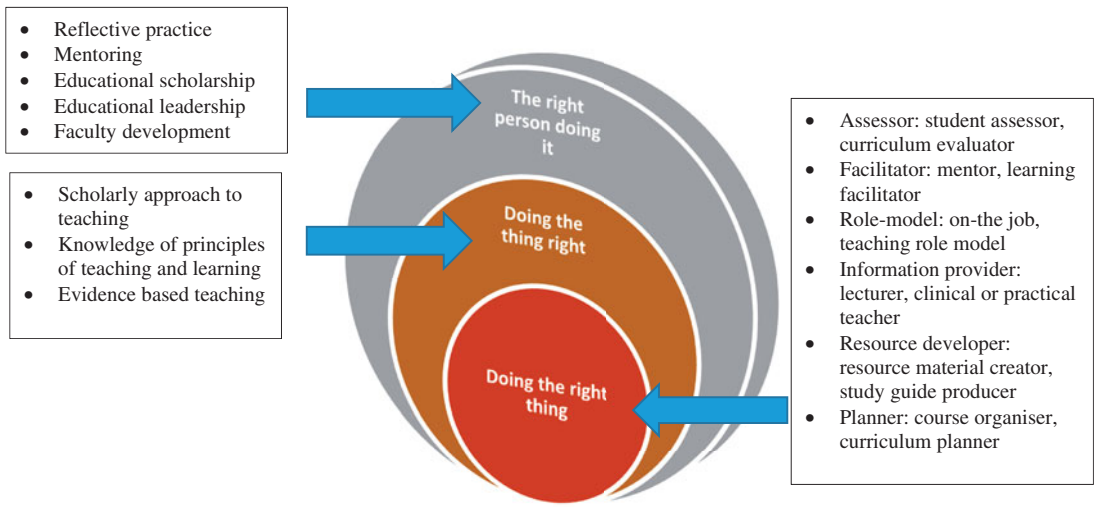

Figure 3. The three-circle model after Harden et al. (1999).

Figure 4. Professional standards of the Academy of Medical Educators (used with permission, 2014).

"The right person doing it"

Residents involved in teaching would be expected to demonstrate the core values of medical educators, which are to promote quality and safety of care, demonstrate professional identity and integrity, demonstrate respect for others and to be committed to scholarship and reflection (Academy of Medical Educators 2014; Figure 4). It follows from this that it is necessary to observe a resident in action teaching and consider how they reflect on what they have done/are doing. Though it is challenging to observe every resident on the program, it is worthwhile to try to build in direct observation when designing these programs. In a number of places, including the USA, UK and Canada, there is an expectation that all residents are trained to teach. Regardless of requirements, institutions should consider the potential value of training all of its residents thus showcasing the importance attributed to a teaching role within the organization (Argyris and Schön 1996; Wenger-Trayner et al. 2015). Finally, the right person doing it refers to those residents who could be developed into future educational scholars and leaders.

Outputs

Outputs include aspects of the programs such as the preparation required, number and types of sessions (didactics, workshops and trips to other educational institutions), overall duration, number of participants and teachers, etc. This is probably the most important element of the program.

What preparation is required of participants?

If participants come to the program already primed, they are likely to get the most out of the sessions. There are several ways of ensuring this: a preliminary video briefing before they sign up; completing a personal assessment of goals; bringing a video recording of a teaching session for feedback; completing a portfolio over a period of time before they come and reflective statements on one or more teaching episodes. Whatever the method, the aim is to activate residents' prior knowledge about their teaching skills and ideally allow them to articulate their goals for the sessions or program. It would be beneficial to take a few minutes at the start of each session to allow residents to identify and focus on their learning goals and needs – and be informed about the additional educational needs.

What needs to be included?

This will be determined by the needs assessment, but would include elements of adult learning theory, reflection skills, giving and receiving feedback, work-based assessment, leadership skills specific to educational roles, questioning skills, e.g. one-minute preceptor, professional role modeling. As the residents progress through the system and assume more senior roles, mentoring and supervision would be added as well as dealing with learners in difficulty. Training in education is a continuum; it may be appropriate to have a modular program that allows people at different levels of experience to build their educational portfolio, and as they achieve seniority, refresh their skills periodically. Box 2 describes how a modular program could be structured.

Box 2. Key content of Resident as Teacher programs: a modular approach.

- **Level 1**
- Specific teaching skills – large group and small group teaching, bedside teaching, assessment of learners, giving feedback, using teaching frameworks, e.g. one-minute preceptor, recognizing learners with deficiencies.
- Role modeling – physician–patient, physician–colleague and health care team communication, humanistic behaviour, professionalism; application of knowledge and clinical reasoning, etc.
- Working on inter-professional teams, including learning from allied health professionals.
- **Level 2**
- Learning theories relevant to clinical teaching.
- Learning styles/how adult learning occurs.
- Best evidence medical education.
- Reflective practice (through observed teaching, videotaped teaching, peer discussions, etc.).
- **Level 3**
- Educational leadership.
- Educational scholarship – curriculum development, research projects, innovation, e.g. designing assessment systems, etc.
- Mentoring others.
- Engagement in teaching the teacher initiatives.

In addition to the explicit curriculum, it is important to remember the informal and hidden curricula that demonstrate which domains of professional practice appear to be valued by institutions (Hafferty & Castellani 2010). An organization that does not release residents for training in education, insists on "twilight sessions" or places demands upon

them which prevent them from participating fully, is demonstrating intentionally or unintentionally that it does not regard education as important, or as a specific set of skills, which require preparation.

Any training program should also include providing participants opportunities to set their own goals and providing direction for future learning and development, which will involve formative feedback, reflection in- and on-action (Schön 1987) and allow for the articulation of "SMART" (Specific, Measurable, Achievable, Relevant, Time bound) plans for the future (Tofade et al. 2012).

Promoting reflective practice

Programs need to be strategic about the optimal use of face-to-face time. Contact time during the program needs to be carefully used and free of distraction such as pagers or telephones. There must be sufficient time for reflection, feedback and evaluation. This may well mean that participants perform some piece of work as preparation for the sessions, which could include either peer observation of their teaching interactions, or feedback from the students or patients who were the beneficiaries of that teaching. As mentioned above, this will serve the function of helping them to articulate what their current levels of knowledge and skills are, and help them determine their future learning needs, which will be invaluable for their future learning. During the sessions, it is not sufficient to provide information and practice teaching techniques. The program should also provide opportunities for participants to compare and reflect upon each other's experiences and discuss the relative merits of different approaches. This will make the process of elaborating possibilities and organizing their thoughts more relevant to their actual contexts.

As it is necessary to model good practice, evaluation and feedback about the program itself would be an important inclusion. This should be both in-action while the program is underway and on-action, at the end of the program.

The final element is to allow time for goal setting. It is helpful to ask participants at the outset of the program what their goals are and again at the end of the program, to see what goals the participants believe they have achieved. Follow-up after the course to check progress, attempt to resolve difficulties and encourage further development can also enhance goals achievement. This may be part of the evaluation process. An evidence-based approach that has been demonstrated to be effective in continuing professional development, can be viewed as a "commitment to change" strategy, one that is important to stimulate change (Wakefield et al. 2003; Wakefield 2004). Participants would commit in writing that they would try to incorporate specific new educational approaches following the program (Mann et al. 2008). Where possible, building in a method to check on the learners' success with their commitments enhances the usefulness of the strategy.

Who should the teachers be?

The teachers in a RaT program should have the knowledge, skills and attitudes they wish the residents to acquire. They need not themselves have been residents in that training program, they need not be "master" teachers or teaching award winners, nor is it essential that all teachers are physicians. All teachers, however, should have a clear understanding of the context in which residents currently operate. Teachers need to be able to create a community of practice (Wenger-Trayner et al. 2015) and have the necessary knowledge, but it seems that key attributes are a formal teaching qualification and experience of training (Gauld & Miller 2004).

Outcomes

Application of the Program Logic model requires that outcomes are discussed at the outset of the planning process, and at all levels planning can be directed towards meeting the desired outcomes. Short-term outcomes directly reflect the objectives of the individual sessions, as well as the overall objectives of the course. They may include increased knowledge and skills related to teaching, change in perception of the importance of teaching and learning principles, and perception of self-efficacy and confidence. Longer term outcomes may include retention of skills and knowledge, educational activities or paths taken (such as higher education degrees, other additional training) and impact of residents' teaching on other learners. A variety of evaluation strategies have been employed to assess the outcomes of RaT programs, these can be categorized as assessment of participants' teaching and evaluation of the RaT program.

Assessment of participants

Assessment of participants may be both formative and summative. The various skills-based sessions provide opportunities for peer as well as teacher input and feedback. Self-assessment and peer assessment can be integrated throughout the program. As a principle, methods of assessment should result in meaningful feedback (Sargeant et al. 2009, 2015). Providing residents with feedback from more than one source and using more than one method can help them understand their own performance better.

Formal assessment of participants' clinical teaching skills can be done through the use of a multi-station OSTE (Morrison et al. 2002, 2004; Zabar et al. 2004; Gaba et al. 2007), which would allow assessment and feedback at the "shows how" level (Miller 1990).

Some programs have adopted observation instruments using rating scales or checklists to record teaching behaviours (Bing-You 1990; Litzelman et al. 1994; Morrison et al. 2000). However, these often raise issues of reliability (inter-rater and intra-rater) and validity.

Program evaluation

If the course is developed using a framework such as the Program Logic model as described above, evaluation data can be gathered at each stage. Different levels of outcomes can be examined as proposed by Kirkpatrick (1994), including learners' reactions, changes in attitudes, perceptions and knowledge, behavioural changes and impact on the organization. Participants' reactions to the course are extremely important; their perceptions of relevance, course organization, quality of instruction, learning and teaching

formats and general arrangements are important for ongoing improvement. They provide information about ways in which learners might be best engaged and motivated; however, evaluation should not stop at this level. Program leaders should develop systems to assess improvement in residents' knowledge of teaching principles, improved skills in simulated settings and change in teaching behaviours in real clinical teaching settings.

Table 1 presents a menu of approaches to consider in evaluating a Resident as Teacher program using the Kirkpatrick model.

Impact

It is important for RaT programs to include mechanisms to determine how the residents' newly acquired skills benefit their learners, the institution and patients. This step is challenging to perform for many reasons. Assessment of learners taught by trained residents will be an important element in assessing the impact of RaT programs. As previously discussed, the effect of residents as teachers on student performance remains unclear (Bing-You & Harvey 1991; Litzelman et al.1994; Wipf et al. 1999; Frattarelli 2003). Performance of residents' learners would be influenced by several variables other than their teaching. It may not be possible to follow the career development of all the participants of the program because many would have left the parent institution. Follow-up surveys might be utilized.

Patient care is impacted by many factors other than the teaching residents, and evaluation of this outcome requires careful design to convince others that those residents engaged in teaching and role modeling also provide higher quality of patient care. In a review of RaT programs, Post et al. (2009) recommended that randomized controlled trials would be very helpful in evaluating their impact, however, few such studies are available (Morrison et al. 2004). Wherever possible, program evaluations of effectiveness should extend to intermediate or longer term outcomes (Ostapchuk et al. 2010).

Potential enablers and barriers

Inputs

Programs may not meet with success without buy-in from all stakeholders. Engaging and convincing institutional leaders about the value of such programs is an important initial step. A road map using the Program Logic template will be valuable when discussing the various steps of program design, implementation and evaluation. Leaders might very well request that the RaT program leader/director embark on a stepwise implementation, demonstrating value along the way.

For faculty teachers, sharing the teaching with their residents eases time pressures, promotes a culture of shared learning and motivates faculty to help develop their residents' teaching skills (Silberberg et al. 2013; Ince-Cushman et al. 2015). It should also encourage faculty teachers to observe residents during their teaching interactions and provide feedback and mentor residents interested in a teaching career track. Such strategies would increase the confidence of residents in their teaching skills and inspire them to teach more.

Institutions will enhance the benefits of Resident as Teacher programs when they explicitly encourage near-peer teaching and mentoring, provide regular opportunities for residents to teach and allow learners to teach in areas of interest, expertise or need (Silberberg et al. 2013). Overt endorsement and recognition of teaching excellence may help to ensure that the hidden, informal and formal curricula are congruent.

Table 1. Approaches to consider in evaluating a Resident as Teacher program using the Kirkpatrick model (Kirkpatrick 1994).

Level of evaluation (Kirkpatrick)	Outcome	Measures
1. Reactions	• Satisfaction • Perceived relevance • Suggestions for improvement	• Resident surveys • Faculty surveys • Focus groups • Short narratives
2a. Attitudes, perceptions	• Self-efficacy • Confidence • Learner-centredness • Perceived value	• Resident surveys • Self-assessed confidence in teaching pre and post • Reflections/narratives on attitude towards teaching
2b. Knowledge and skills	• Principles of teaching and learning principles • Adult learning theory • Techniques for giving feedback • Principles of learner assessment	• Knowledge test • Self-assessment
3. Behaviour	• Demonstration of skills, behaviour and knowledge	• OSTE • Direct observation • Microteaching and debriefing • Multisource feedback • Peer assessment • Self-assessment • Learner assessment
4a. Benefits to learners, patients	• Improving learning of others • Increased mentoring of learners • Recognition and remediation of problem learners	• Changes in learner performance • Self-reports • Documentation of mentoring • Documentation of efforts at remediation
4b. Benefits to institution	• Sustained RaT programs • Change in education culture	• Number of residents on clinical educator career tracks • Educational leadership roles • Educational scholarship • Formation of teacher networks

Activities

Pitfalls of many educational programs include lack of clarity in overall goals and curricular objectives, replication of topics from programs at other institutions without reflecting on relevance to local educational environment, lack of attention to educational strategies that can best deliver the content and deficient planning in program evaluation.

Residents are important teachers to their students and peers who aim to learn different, sometimes unique, skills from their residents compared with faculty teachers (Gil et al. 2009; Snell 2011; Karani et al. 2014; Ince-Cushman et al. 2015). Such skills include patient management and communication skills, strategies to navigate the complex clinical workplace, work efficiency, etc. Yet, most RaT programs focus entirely on teaching skills traditionally held as essential for clinical teachers. Role modeling is considered more valuable than acquisition of knowledge and learners look to residents to provide a safe learning environment in which they learn patient care (Mann et al. 2007). RaT programs should actively prepare residents to teach these unique skills as well as recognize the importance of role modeling in their interactions with junior learners. Residents also need to be trained to teach on-the-fly, at each opportunity, by "thinking out loud" and "teaching while working".

Outputs

Many RaT programs tend to be a one-shot approach consisting of a series of workshops, day-long seminars or retreats. Non-longitudinal approaches to faculty development have not been shown to be successful in sustaining change in behaviour. Teaching workshops without opportunities to practise skills are less likely to be of value (Weissman et al. 2006; Wachtel et al. 2013). Regardless of the main mode of RaT program delivery, some longitudinal aspect should be built in. This can be as simple as mentoring and opportunities for periodic reflections or as extensive as a separate educational track in residency programs (Smith et al. 2014; Adamson et al. 2015).

Outcomes

At many institutions in the USA, Canada, UK, Europe and Australia, residents have opportunities to teach junior trainees formally or informally and several institutions have implemented RaT programs. Often, program evaluation is limited to examining participant satisfaction with the program or self-assessment of skills. Outcomes for participants can pertain to cognitive, behavioural and attitudinal domains and each program needs to identify specific outcomes of interest and their methods for assessing achievement of these outcomes. Residents need to be given opportunities to practise learned skills in real teaching settings, observed by experienced educators with debriefing and feedback. Debriefing should also include self-reflection of performance, both reflection in action and reflection on action (Schön 1987). Attitudinal outcomes are equally important, including the teaching identity of residents and their motivation to teach. Sound qualitative approaches are needed to study these outcomes.

Conclusions

Junior doctors in many countries around the world teach peers and/or junior trainees formally or informally, but are often unprepared to perform this role effectively and efficiently. We believe that it is important to prepare residents specifically for teaching roles even at institutions where residents are not required to teach formally. Using established frameworks can help program leaders adopt a systematic approach to program design and implementation and produces a road map to refer to along the way to ensure that each step is completed and the right outcomes are being tracked. In this Guide, we have used the Kellogg Program Logic outcomes model to guide educators in program development; the Dundee three-circle model to help determine the content and educational strategies and the Kirkpatrick model to guide program evaluation. We do not provide a recipe for designing a perfect RaT program, but suggest a systematic and thoughtful approach, a general direction and describe a range of options that medical educators can use to develop a program that is consistent with their institutional goals, relevant to their local context and fits into their budget and resources.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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