Leveraging technological change to address racial injustice and worker shortages in frontline care delivery

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As the seemingly never-ending battle against COVID-19 soldiers on, women and POC (people of colour) constitute the overwhelming majority of troops drawn into battle. They disproportionately staff many of the frontline healthcare delivery jobs most vulnerable to SARS-CoV-2, and now its most virulent mutation, the Delta variant. These jobs include ‘enrolled’ (in the UK) or ‘licensed’ (in the USA) practical nurses (LPNs), certified nursing assistants (CNAs) and in-home carers, all of whom put themselves and their families at great personal risk for the benefit of their patients.

Pandemic conditions may be a relatively new development for these workers, but the abhorrent quality of frontline healthcare jobs is not. While ‘job quality’ remains a subjective and elusive construct, we can all imagine a ‘high-quality’ bundle of economic, sociological and psychological attributes—generous or at least sufficient pay and benefits, job security and opportunities for advancement, a modicum of discretion over and interest in one’s work, and perhaps some control over one’s working time. We might even hope that over time, technological advances including smartphones and robots could somehow encourage an upward drift in the incidence of all of these sought-after ascriptions. But for decades, technology-centred automation has eroded job quality, making it easier for managers to squeeze wages and ignore poor employment conditions.

Ironically, COVID-19 provides a rare opportunity. With its lead foot on the gas pedal, it accelerates workplace technological change—all while managers and policymakers sit squarely in the driver’s seat. If these sectoral leaders seize the wheel, they can steer the coach and the economy away from technology-centred automation and toward the path of work-centred technification. In fact, a recent report undertaken in the USA suggests that for all of the misery wrought by COVID-19, it could actually induce leaders—even in that fragmented system—to implement emerging technologies in a way that shores up employment conditions for essential frontline care deliverers.

Conversely, if the sector remains on its present path, COVID-19 will instead hasten the forms of technological adoption that abrade job quality in frontline care delivery. As if that were not enough to sound the alarm, this unguided, indiscriminate adoption of information and communications technologies (ICTs) and robotics could imperil patient safety by exacerbating the structural shortages in workers willing to undertake this work or the cognitive overload and burnout among those remaining.

POC AND THE TALE OF TWO PARADIGMS

To be clear, any shock to the healthcare sector—be it epidemiological, technological or anything else—hits women and POC unswervingly. Health policy researchers have long argued that even in the absence of distress, the healthcare systems of developed nations shortchange indigent women and POC, disparities the pandemic has actually inflated. They have also considered the ways that new technologies, telehealth in particular, could be deployed to alleviate inequalities in access to care.

Curiously, this research has focused exclusively on women and POC as patients, puzzling given workforce demographics and labour market data.

While my data focus on the US case, the arguments generalise to many other healthcare systems, including that of Britain. Although women constitute less than half of the US workforce, they make up about 78% of healthcare employees. The US federal government projects the fastest growing occupations in the sector over the next decade will be home health aides and personal care attendants. Each pays about $24 000 (=£17 858) per year, less than two-thirds the economy-wide median wage. Women staff roughly 85% of these jobs and nearly 9 of 10 LPN and CNA jobs. Moreover, whereas POC hold 36% of all jobs in the USA, 65% of home health aides and 56% of personal care attendants—the two ‘home carer’ job classifications—identify as POC. In hospitals, about 60% of orderlies—or porters, that is, those transporting patients and equipment—and half of food service workers identify as POC. Of all these jobs, only LPNs surpass the economy-wide US earnings median. Orderlies and CNAs suffer injuries at about twice the rate of the economy-wide average. And, while not an issue in the UK, in-home carers are less than half as likely as other healthcare workers to have employer-provided or union-provided health insurance. That should give pause, as it implies that many of these care-providing workers themselves lack access to healthcare, unless they are ‘lucky enough’ to qualify for means-tested government aid intended for the indigent.

So, if COVID-19 exacerbates deficits in job quality for women and POC healthcare deliverers, how can technology help? Healthcare leaders and employers including the National Health Service (NHS) in Britain and scores of private provider...
groups in the USA should use technology to create the virtuous circle characterised by work-centred technification. The process begins when employers lean on new technologies to occasion the redesign of jobs in ways that ask more of workers, namely that they make more decisions at the point of care and accept more accountability. This would yield immediate increases in autonomy and control, key psychological elements of job quality. But, it would also necessitate employer investments in training and upskilling, making workers more productive and more worth holding onto.\textsuperscript{14} With productivity and value come increased wages and employment security, facilitating further increases in frontline discretion and responsibility, ultimately rewarding workers with improved job quality and employers by stemming perennial worker shortages. As women and POC disproportionately fill these vastly improved frontline care delivery jobs, they will benefit directly from COVID-19-accelerated technological advances.

But, we are far from realising this exemplar. To achieve it, the sector must first transition away from the prevailing ethos of technology-centred automation, predicated on the ‘technophilic’ and ‘misanthropic’ proposition that humans are error prone, inconsistent and unreliable.\textsuperscript{15} These often tacit beliefs drive engineers and developers, nearly all of whom are educated according to this paradigm, to automate as much as possible, leaving only the residual tasks to human labour. The resulting technologies drive the atomisation of work, robbing frontline workers of the tasks that once made their jobs coherent and meaningful. Moreover, many of the skills workers no longer use regularly atrophy, rendering workers less reliable and more error prone in the rare and unpredictable moments they must call upon these skills. Behold the self-fulfilling prophesy. Furthermore, the tasks that remain for labour once their work has been automated, especially once decontextualised and stripped of meaning, are often those for which workers are least equipped such as data entry and the passive monitoring of screens.\textsuperscript{16} Technology-centred automation therefore gives way to a viscous circle in which unfulfilled, poorly paid workers make mistakes. They are not the object of any sort of employer-provided skills investment that might bond them to their employer or provide them opportunities for advancement. Perhaps this explains why 70\% of care workers in the UK earn less than £10 an hour\textsuperscript{17} and why the National Care Association projects 170 000 vacancies this year.\textsuperscript{18} Again, these are the aforementioned ‘essential’ frontline care deliverers, disproportionately women and POC, on the frontlines of the pandemic.

Electronic visit verification (EVV) serves as a case in point (table 1). In the USA—much as they are in Britain—home carers are provided by for-profit agencies that contract with patients or payers. Medicare and Medicaid, the US government-funding mechanisms for the elderly, disabled and poor, foot most of the bill. Scant bargaining power has long prevented these workers—over 85\% women and about 60\% POC—from capitalising on the structural increases in demand for their services. To think that aides’ use of smartphones could improve the quality of their services or the efficiency with which they deliver them strikes most as reasonable, even shrewd. But, there are many ways digital communications can be deployed in this context. Under EVV, smartphone apps surveil, track and micromanage home health and personal care aides, effectively Taylorising away what little control and autonomy aides had in accomplishing their work. And, thanks to language in the Obama-era 21st Century Cures Act, all home care agencies nationwide must adopt this technology lest they cede eligibility for full payment under government programmes.

Similarly, many hospitals see the value in deploying service robots for tasks ranging from meal delivery to cleaning and disinfecting. But, by default, most play according to the technology-centred songbook, prioritising short-term cost-cutting over any attempt to improve outcomes for workers, let alone patients. El Camino Hospital, with facilities in Los Gatos and Mountainview, California, emerged as an early adopter of this technology over a decade ago. Managers made 140 workers redundant at the same time they invested in their first 19 semiautonomous Aethon TUG ‘smart carts’. At the time, a hospital administrator stated on the record that 19 TUGs performed US$1 million worth of human labour per year—for a cost of about US$350 000.\textsuperscript{19}

So, how can healthcare leaders effect a transition from the technology-centred approach, exemplified by policy-promoted EVV and El Camino’s robot deployment, to a work-centred one? Rather than asking, ‘What are all the things the computer can do?’, they could ask ‘What do my employees excel at, and how might technology best exploit these strengths?’. This evokes an entirely different technology adoption process that ultimately benefits patients by addressing sectoral labour market challenges. Work-centred technification ensures that workers, providers and patients share the fruits of technological advancement, including improvements in economic, social and psychological facets of job quality, thereby addressing the structural issues driving short-ages and impeding care delivery.

Consider three more concrete examples—telepresence, robots and machine learning (table 1). In each case, providers can deploy seemingly identical technology along two different paths, yielding disparate outcomes for the workers using them. Thoughtfully deployed new technologies can actually make frontline jobs more stable and more stimulating while boosting pay and conditions. To illustrate, a work-centred approach

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Technology-Centred automation</th>
<th>Work-Centred technification</th>
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</thead>
<tbody>
<tr>
<td>Digital communications and telepresence</td>
<td>Digital communication technologies such as electronic visit verification are used to increase surveillance and monitoring of workers.</td>
<td>Digital communications technologies are used to augment the role of home care workers and to improve coordination of care across providers.</td>
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<td></td>
<td>Chatbots are used to curtail staffing, with a limited use of telemedicine.</td>
<td>Teledicine is used to expand access to care and to extend job opportunities and job quality for nurses and frontline health care workers.</td>
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<tr>
<td>Service robots</td>
<td>Robots are used to reduce staffing for orderlies, dietary clerks, laundry workers and cleaners.</td>
<td>Robots are used in a way that calls for worker upskilling and an enhanced role in relation to patients.</td>
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<tr>
<td>Artificial intelligence and machine learning</td>
<td>AI and machine learning (such as that embedded in clinical decision support) are used to diminish people’s jobs and the role of human-oriented skills in the provision of care.</td>
<td>AI and machine learning are used to drive efficiency while enhancing people’s jobs, creating new roles for skilled workers, and amplifying human-oriented skills in the provision of care.</td>
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to the use of digital communications and telepresence sees it augmenting the role of home carer by giving them the tools they need to manage and coordinate the work of the many clinicians, social workers and others who serve their clients—what some label ‘augmented home health’. As home care workers spend more time with the patient than any other provider, and do so in the patient’s customary environs, no one is more temporally or spatially equipped to undertake this coordinating role. Likewise, clinicians can leverage telemedicine to expand access and reduce costs, particularly when it is complemented by the work of on-site, frontline workers with enhanced training and responsibilities. One hospital system, in particular, has experimented with sending LPNs to patients’ homes with a stethoscope, otoscope or the like, to mediate between a physician or physician extender in a central location and a homebound patient in need of emergency care or chronic care management. But, futurist Martin Ford sees even greater possibilities in this arrangement, particularly as telemedicine is imbued with increased artificial intelligence and machine learning capabilities. Namely, an entirely new category of medical professional, trained at the bachelors or masters level, could examine patients, and then translate and transmit the symptoms into the cloud-based, constantly updating, computer system. They could then receive and translate the system’s response into a diagnosis and begin treatment on the spot. Certainly, technology like this would have great promise as a way of alleviating the system of the burdens of routine care as well as of the management of chronic conditions, including diabetes and hypertension.

Similarly, the New York-based research arm of SEIU1199 has suggested that hospitals use robots to alleviate orderlies of their most mundane and gruelling physical tasks, freeing them up to take on more value-added, patient-facing work. Once orderlies are relieved of their responsibility for moving supplies, they can leverage their unique human ability to interact with patients as well as their knowledge of the facility and the campus to transport and set up new telehealth carts and to prepare patients for their telehealth interactions. This enhanced role would require an additional modicum of technical skill and perhaps even some incremental training on patient interaction, but nothing beyond the aptitude of those whose jobs would be affected. These transformed jobs would be relatively safe from technological displacement and would boost the valued-added nature of the tasks orderlies perform.

MOVING FORWARD

For evidence that COVID-19 accelerates technological advances in frontline care delivery, consider two disparate examples—telemedicine and cleaning robots. Despite its technological feasibility and patients’ earnest preferences, doctors and payers long resisted the adoption of telemedicine. The latter refused to pay for it, fearing patients would ‘overconsume’ easy-to-access teleservices, and providers thus expected it to flood them with ‘ uncompensated’ care delivery demands. As a result, prior to the pandemic, roughly 2% of patient appointments were conducted telephonically, largely by providers untethered to the traditional, fee-for-service reimbursement mechanism. But 1 year into the pandemic, by March of 2021, over 61% of Americans had experienced a televisit. Another survey of 50 large healthcare systems showed that the share of primary care visits conducted virtually shot up from a pre-pandemic level of 5% to a peak of 45%. And, a poll of healthcare professionals suggested that close to 20% of post-pandemic patient appointments would likely be conducted virtually rather than in person. They may be underestimating, as nearly 90% of patients surveyed elsewhere noted they ‘want(ed) to continue using telehealth services for non-urgent consultations after COVID-19 had passed.’

COVID-19 also hastened the delayed onslaught of robot cleaners. For years, hospital administrators knew that high-frequency, ultraviolet light could be used to sanitise rooms. In fact, a cluster of these lamps, once wheeled into a room, can usually accomplish the task in under an hour, sometimes reaching surfaces that human cleaners cannot. Even so, perhaps owing to the ease with which hospital administrators could outsource and skimp on cleaning, the upfront investment made little sense. That calculus changed, however, once it became especially dangerous for human cleaners to enter rooms full of lethal microbes, leading to a massive leftward shift in the supply curve for hospital cleaners—over half of which are POC. Automation is ‘sticky’; it does not typically recede once it is in place. So, if San Diego’s Sharp Grossmont Hospital’s experience with LightStrike robots is any indication, then cleaning robots, like telemedicine, will likely be a permanent fixture in post-pandemic healthcare delivery.

But, the outlook for the sector’s workforce need not be bleak. COVID-19’s acceleration of technological uptake actually positions provider organisations and their leaders to effect a transition that benefits workers and patients by elevating frontline care delivery jobs. With some coaxing from policymakers, employers can accomplish this through a work-centred approach to technological adoption. By acknowledging technology as a tool or as a platform for supporting workers—a means rather than an end—leaders can more easily turn their focus to workers’ needs and organisational reforms.

To begin, employers must train workers before the parties can leverage new technologies for decision support. While this may seem obvious, case study research undertaken in a specialised hospital trust in the UK suggests that leaders often undermine the effectiveness of new technologies by failing to identify specific workers for training based on their roles and responsibilities in caregiving. We also have concrete evidence of what happens when leaders overlook training. Statistical analyses of medical error rates at a multi-unit hospital system in Asia having recently undertaken wide-scale automation reveal that the subjective nature of decision-making requires that frontline workers be trained not only on the technical aspects of new systems, but also in the intricacies of care quality and patient safety.

Training imparts knowledge, but employers establish the work rules and the culture that allow workers to use it. Workers must feel that they have the authority to use their new tools to make decisions at the point of care, that is, that leaders ‘have their back’. Research on ICT has long touted the necessity of parallel investments in ‘organisational complements’ alongside technological investment, and more recent empirical work reveals how difficult it can be—especially in the healthcare sector—for first-level managers to devolve power and authority to the frontlines. These dynamics only heighten the challenge for organisational leadership.

Workers need even more than the training, the tools and permission to use them. Employers must ensure that frontline workers accept or ‘buy into’ the new, technologically enabled methods of care delivery, without which sought-after productivity improvements will be delayed, damped or altogether undetectable. Research from both the ICT and industrial relations fields highlights the importance of deep worker engagement
in the earliest stages of the technological adoption process, perhaps even involvement in evaluating and choosing between technological options. Such involvement can counter vendors’ tendencies towards technology- and work-centred approaches. Furthermore, those workers expected to use the technology must be provided a degree of employment and wage security. Kaiser Permanente serves as a case in point. It presently operates 39 hospitals and more than 700 medical offices in the USA. Early hiccups in its transition from paper-based recordkeeping and legacy databases to a fully integrated, electronic health record system first revealed the importance of a credible promise that workers’ optimal use of the new systems would not erode their own or their coworkers’ economic well-being. In fact, these rules were eventually codified in ‘effects bargaining’ and remain in place more than a decade later. Interestingly, researchers point to the same case to demonstrate more broadly the ways in which unions can partner with employers in the wake of a technological change initiative, increasing the speed and likelihood of its eventual success.33

Finally and relatedly, those leaders feeling constrained by laws requiring consultation with workers either individually or through work councils, unions or other representative bodies, should instead embrace these institutions. They can be enlisted to aid management’s monitoring of technological deployment and use, particularly where workers have been formally or informally provided the aforementioned employment and wage security or even where workers were provided pay increases in exchange for accepting the new technology. These same institutions will also have their ears to the ground with respect to training needs and deficiencies, information already shown to be of great value to managers. Furthermore, research in the USA reveals that unions can help mid-level or facility-level leaders make the case for technological investment to higher-ups more focused on short-term gains and losses.34

But, these work-centred choices are only possible if policymakers craft an agenda intended to motivate and reward these choices on the part of employers or managers. On its face, single-payer or single-provider systems such as Canada’s provincial and subprovincial health authorities can do this with relative ease, as could some parts of the UK NHS—namely, the trusts that provide acute, mental health, ambulatory and community care. These systems have a key advantage over more fragmented ones. They have built-in economic incentives to facilitate the integration of data, practices and functions, something lacking in systems like the USA that still rely largely on the fee-for-service rather than a value-based care model. Yet, perhaps counterintuitively, the fragmented nature of the US system may actually place more policy levers within reach. To seize them, policymakers must first assert their power over payment models. Medicare and Medicaid can lead by example, requiring frontline workers to contribute to practice-level and agency-level decision-making around technology selection and use.

Second, the EVV-related language in the 21st Century Cures Act, while antithetical to these specific goals, demonstrates the instrumentality that policy has to shape organisations’ technological choices and outcomes. Policymakers could employ the same mechanism to instead enable a model that augments the role of home care workers, asking them to leverage cloud-connected smartphones to serve as care coordinators for their clients. This privileges the aforementioned, work-centred, augmented home health model over electronic visit verification, its technology-centred analogue.

Third, since elevating responsibilities necessitates enhanced training, policies that encourage work-centred technification must also encourage the requisite training and development. Policymakers could adjust reimbursement and even tax policy to assist leaders in this effort. They, like the sector’s employers and managers, could partner with healthcare unions, asking them to absorb responsibility for training and certification, just as craft unions have long done in Britain and other Anglo-derived industrial relations systems such as those of Canada, the USA and Australia.

Finally, to facilitate leaders’ efforts to hasten work-centred technification, policy must allow and in fact encourage experimentation. For example, in the USA, policymakers must reform the state-based medical licensing regime and allow temporary relaxation of scope-of-practice rules. Without these reprieves, attempts to use LPNs as on-site mediators between patients and telehealth technology, for example, would run afoot of the law. Even temporary easements would allow leaders and policymakers to assess technologies intended to provide frontline workers better healthcare information and patient data. They could then build upon those that succeed and abandon or modify those that do not.

CONCLUSION

The healthcare sector faces racial and gender disparities not only in the quality of care delivered, but in the quality of jobs for those delivering it. COVID-19 has increased these gaps just at a time when we should be scrutinising racial and economic injustice. But, new technologies could instead be used to counter these forces, improving the healthcare roles disproportionately filled by women and POC who have sacrificed their own health security for that of their patients. Bolstering the quality of these jobs would also address worker shortages that erode access, quality and efficiency for patients. But leaders will squander this opportunity unless they resist technology that does as much as possible and consigns residual tasks to the frontline workforce. Instead, practice managers and other leaders, aided by carefully crafted health policy, must confront technological change with a work-centred ethos. This approach respects human dignity by targeting the structural inequities in healthcare delivery made only more salient by the ravages of COVID-19.

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