Analysis of Factors that Lead to Successful Blue Wrap Recycling Programs

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

Sharanya Nagendra

Spring 2025

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

MC Forelle, Department of Engineering and Society

Introduction

One of the most important aspects of medical care is maintaining sterility during patient care. This is especially crucial during surgeries and invasive procedures, where instruments and medical devices, if contaminated, could cause detrimental and even fatal infections (De Lissovoy et al., 2009). To ensure this sterility, sterilization wrap, more commonly known as blue wrap, is wrapped around surgical instruments to keep the environment contained. The material allows the sterilizing agent, most often steam, to pass through blue wrap to the instruments and then structurally changes the material to close the pores in the blue wrap to prevent any contaminants from entering the pouch after the sterilization process (Bahk, 2024). Blue wrap is considered single use because as soon as the instruments are opened, the material is no longer considered "sterile" to be reused in a medical setting as the pores have closed and will not allow a sterilizing agent to pass through (Minnesota Technical Assistance Program [MnTAP], n.d.). Although sterilization wrap has been an efficient way to sterilize surgical instruments, it cannot be reused and even uncontaminated blue wrap is thrown away contributing to a significant portion of a hospital's waste stream. Sterilization wrap accounts for about 19% of all waste in the surgical department according to the US Environmental Protection Agency (Environmental Protection Agency [EPA], 2002).

Despite sterilization wrap being such a high percentage of hospital waste, there are very few programs to recycle and repurpose this material. This is concerning as this amount accounts to around 255 million pounds of blue wrap disposed of each year from the operating room that end up in landfills (Bodkin, 2018). However, 80% of the blue wrap that is used is clean and can be recycled and repurposed with the right infrastructure (Flanders, 2017). In terms of the physical recycling of the sterilization wrap, there are many logistical barriers that can impact the

feasibility of recycling this material. Blue wrap is made from SMS (spunbond-meltblown-spunbond) polypropylene, a #5 plastic and is not recycled by many facilities. This is because #5 plastics have a low market value and without a regional recycler these hospitals can use for blue wrap, recycling may not be feasible (EPA, 2002). The cost of transportation and a lack of available recycling infrastructure can hinder efforts to expand blue wrap recycling initiatives (Ogden, 2009).

Not only does disposing of blue wrap in landfills have damaging effects to the environment, but it also has a significant effect on healthcare worker morale. Many doctors report a negative feeling when disposing of single use or disposable materials because they are aware of the waste. Around 95% of surgeons even report a willingness to change their operating room workflow behaviors to reduce waste (Meyer et al., 2022). Despite the clear interest in reducing blue wrap waste, why have such practices not been widely adopted?

In this investigation, I argue that the main obstacles to establishing a successful blue wrap recycling initiative stem from broader systemic challenges. In the literature review, I will explore current knowledge on plastics recycling and the unique challenges of implementing recycling programs in healthcare settings. In my analysis, I will examine three key conditions that contribute to a successful blue wrap recycling program. First, I will demonstrate that for a blue wrap recycling program to be implemented for the long-term, it must be economically sustainable, not just in terms of upfront costs but also through ongoing infrastructure. Second, I will highlight the importance of a dependable social collection partner, such as a recycler who can handle the volume and specificity of blue wrap material to be recycled. Finally, I will analyze the role of internal hospital dynamics, emphasizing how support from hospital leadership, clinicians, and environmental services is critical to maintaining the consistency and

momentum required for long-term program success. Through this analysis, I will show that the significant barriers in a hospital system setting up a successful blue wrap recycling program are rooted in economic and social contexts.

Literature Review

Plastics recycling plays an important role in reducing the environmental impact of plastics. Modern recycling emerged in the 1970s when after World War II, landfills started filling up and recycling was a way to save landfill space and the environment (Eldred, 2025). Plastics in landfills degrade through photodegradation which can take anywhere from 20 to 500 years depending on the material and structure of plastic and the exposure to sunlight (Chariot Energy, 2024). This persistence in the environment is largely due to plastics being derived from petroleum, which is more energy intensive to break down. Recycling has made measurable progress over the past several decades. The amount of waste sent to landfills has decreased from 94 percent in 1960 to 52 percent in 2018, while recycling rates have increased from about 10 percent in 1980 to over 32 percent in 2023 (Eldred, 2025). However, not all types of plastic are recycled equally. Polypropylene, the material blue wrap is made out of, can take upto 30 years to degrade naturally and may release harmful manufacturing additives such as cadmium and lead into the environment during the process (Wang et. al, 2022).

Polypropylene makes up about 17% of all plastics produced, but the recycling rate is around 3% (Bovee, 2024). This is because not all recyclers accept polypropylene. In fact, less than 30% of Americans have access to polypropylene recyclers (Brooks, 2022). Several challenges deter recycling facilities from processing this material. Since polypropylene is a thermoplastic, it is sensitive to heat and loses chemical integrity during the process of mechanical recycling. By the time it goes through 2 or 3 traditional recycling cycles, the material

will be unusable. Recycling this becomes less profitable since the material does not repeatedly circulate in the economy. Emerging chemical recycling methods, such as solvent-based purification, show promise in restoring polypropylene to near-virgin quality, however, they remain costly and not widely implemented (Bovee, 2024).

These limitations in plastic recycling become even more pronounced in healthcare settings, where the use of single use materials like polypropylene is widespread. One of the main challenges hospitals face with implementing recycling programs is the complexity of the hospital operations and employee systems (Save, n.d.). This results in unorganized and very diffused efforts especially in larger hospital systems. Many experts in the field suggest starting small to overcome this barrier and to start with plastics that generate the largest quantities (Healthcare Plastics Recycling Council, n.d.; Piser, 2024). This can be further focused on implementation in high impact areas such as operating rooms.

Some hospitals in the US have developed blue wrap recycling programs with varying degrees of success. Programs such as Blue Renew have expanded to over 400 hospitals and process millions of pounds of plastic waste (Workman, 2017). Programs like these have shown considerable buy in from hospitals and show that there is potential for large scale recycling. They provide hospitals with recycling containers, coordinate pickup logistics, and partner with companies to handle the collected material. However, smaller more localized programs, like the one at Shawnee Mission Medical Center, have faced significant limitations in setting up the program. Initial barriers included challenges in identifying a local plastics recycler that would accept blue wrap, concerns over freight costs that could offset environmental benefits, and a lack of infrastructure to bale plastic and store the material (Ogden, 2009). Many hospitals prioritize patient care expenses over sustainability initiatives, making it difficult to justify the initial

investment in recycling infrastructure (EPA, 2002). While there are documented efforts to recycle blue wrap and other hospital plastics, the existing literature primarily focuses on program outcomes rather than the underlying factors that influence success or failure. Much of the available information comes from case studies or reports without standardized evaluation methods, making it difficult to compare initiatives across institutions.

I will be using The Social Construction of Technology (SCOT) by Trevor J. Pinch and Wiebe E. Bijker as my guiding theoretical framework. This approach is a useful lens Hospital recycling efforts do not exist in a vacuum. Social groups such as hospital staff, waste management, and hospital administrators interpret and influence the implementation of blue wrap recycling programs. I will apply SCOT to analyze how different social groups interpret the purpose and value of recycling initiatives and how these interpretations can enable or constrain sustainable practices in healthcare settings. By examining these perspectives, I will also identify key factors that determine blue wrap recycling programs.

SCOT emphasizes the role of relevant social groups which means that stakeholders who belong to the same group understand blue wrap using the same set of meanings. The framework also highlights interpretative flexibility which means that different social groups can associate different meanings or purposes to the same technology. Over time, this can cause stabilization and closure, where a dominant understanding of the technology becomes standardized (Pinch & Bijker, 1984).

Methods

This study offers an in-depth analysis of key factors to consider when creating a successful blue wrap recycling program including a brief case study of the Blue Renew program from Halyard Health. To conduct this research and analysis, I look at a collection of primary and

secondary sources. Primary data consists of implementation documents and program materials from Blue Renew. To understand what a hospital employee might experience when trying to get a blue wrap recycling program started at their healthcare facility, I started my investigation by going through the process myself for the University of Virginia Hospital. As part of my capstone project, I had the opportunity to shadow the operating rooms and work with UVA Hospital Sustainability over the past year. This experience provided valuable insight into the flow of blue wrap within the surgical setting and the institution's decision-making priorities when implementing sustainable initiatives. Economic viability, logistical feasibility, and environmental impact emerged as central considerations. Given that Blue Renew aligned with these institutional priorities, it was selected as a focal point for deeper investigation. Accordingly, these criteria are emphasized throughout the analysis that follows. Secondary data includes sustainability blogs, news stories, and articles ranging from the early 2000s to the present, as plastic consumption and perspectives on sustainability have evolved. This is where I will apply the SCOT framework to my research. By identifying patterns across these sources and over time I will illustrate which strategies will lead to successful program implementation.

Applying the SCOT framework to blue wrap recycling will reveal how different hospital stakeholders interpret and prioritize the material. For example, relevant social groups such as hospital administrators may view blue wrap as an inexpensive product they purchase, treating it as a disposable supply with limited reuse potential. In contrast, surgical staff may associate blue wrap with infection prevention and clinical effectiveness, emphasizing its role in maintaining sterility during procedures. These differing interpretations demonstrate interpretive flexibility. Over time, as hospitals adopt blue wrap recycling programs and develop internal consensus around their value, a process of stabilization and closure can occur. However, stabilization and

closure have not yet occurred, as competing interpretations among social groups continue to influence whether and how these programs are implemented. The combination of SCOT analysis and the primary and secondary data collected will provide a multidimensional view of the barriers and enablers to creating successful blue wrap recycling programs in hospitals.

Analysis

The economic structure of most blue wrap recycling programs fails to provide hospitals with compelling cost benefits, discouraging long-term participation. Hospitals, a relevant social group, prioritize operational efficiency in patient care while being cost-effective. This is why blue wrap was widely adopted. However, due to this prioritization, hospitals often struggle to justify the upfront investment in recycling infrastructure when that investment does not promise a clear return (EPA, 2002). Additionally, the Minnesota Technical Assistance Program (MnTAP) explicitly advises against healthcare facilities independently managing the "sorting, baling, transporting, and developing agreements" to sell used blue wrap, as the extensive "labor, time, equipment, fuel, capital investment, and other resources needed would not likely produce a return on investment" especially after China's 2018 ban on importing plastic recyclables severely weakened global markets (MnTAP, n.d.). This ban, known as the National Sword Policy, stopped the importation of solid waste, including scrap plastic such as blue wrap. The policy led to a 30% drop in the average price China paid to import recyclable waste because the demand for imported waste dropped (Lin et al. 2023). Before the ban, China processed a significant portion of the world's plastic waste, including low-grade materials like hospital blue wrap. After the ban, many developed countries, including the U.S., began redirecting plastic waste to Southeast Asia, overwhelming local systems and further destabilizing global plastic markets (Lin et al. 2023). Hospitals that might have once relied on indirect participation in global plastic recycling chains

now face an absence of viable end markets for blue wrap. Due to the high costs of creating an in-house recycling pipeline and the collapse of international buyers, hospitals are often forced to depend on local waste haulers to recycle blue wrap. However, local waste collectors are themselves constrained by the global market collapse and stricter contamination standards. Not only are startup costs a barrier for hospitals, but the availability and behavior of local recycling partners are shaped by international recycling markets.

Offsetting the economic cost is important in creating a successful blue wrap recycling program. While programs such as Halyard Health's Blue Renew offer a seemingly cost-free alternative, with Halyard assisting and covering the cost of implementation, those benefits are limited. The savings advertised on the website are "upto $6,000 per facility" which may not be compelling savings, especially for larger facilities that might have to make operational changes internally. Even though some savings may result from reduced landfill use, hospitals often absorb internal costs such as staff retraining and operational adjustments, particularly during the early phases of implementation. In addition, Blue Renew does not pay hospitals for their collected blue wrap. Instead, revenue from the recycled material (marketed as BlueCON resin) goes to the waste collectors, transporters, and the program itself ("The ultimate guide to sterilization wrap recycling and repurposing at your hospital.", n.d.). Products made from the material are "sold to the healthcare sector, creating a closed loop model" putting recycled polypropylene back into the economy and diverting from waste streams ("Hospital sustainability with Blue Renew: Halyard", 2024). Though some cost savings may be realized through reduced landfill use, hospitals receive no direct profit from participating in these programs, and may still incur internal costs of implementing new systems and processes and productivity loss when employees are in the learning phase. This dynamic highlights the interpretive flexibility of blue

wrap recycling. Hospital sustainability advocates may see environmental value and long-term savings, however, hospital administrators may interpret the same technology as a significant expense in the short-term. This economic imbalance reveals that blue wrap recycling, as it currently exists, is not financially beneficial for hospitals especially in the short-term. While programs like Blue Renew reduce landfill waste, they do so by profiting from hospital contributions without offering a share of that value in return. Thus, until systemic changes are made with regards to blue wrap recycling, there will be little financial incentives for hospitals to participate.

Blue wrap recycling programs need the participation and cooperation of a local hauler for success. A relevant social group whose role will "ensure that [blue wrap] is actually going to be recycled" after collection are local haulers. Without a hauler willing to pick up blue wrap and guarantee it reaches a recycling facility, any planning effort on the part of the hospital is rendered ineffective. Recycling programs thrive when a hospital's waste management partner not only "shares similar sustainability values" but also maintains a consistent presence by "visit[ing] the dock frequently" at the facility ("The ultimate guide to sterilization wrap recycling and repurposing at your hospital", n.d.). However, these partnerships are far from guaranteed. From the perspective of the waste processors, "the relatively small amount of plastic waste from a hospital" in comparison to plastic from other industries may seem "insignificant" and risky due to the increased potential of "contaminated materials" ("Barriers to recycling healthcare plastics: HPRC", 2023). Since blue wrap is made from polypropylene and not all haulers recycle the material, blue wrap recycling might not be favorable in the big picture. In this context, the interpretive flexibility of blue wrap is demonstrated by hospitals that may view blue wrap as a valuable recyclable material with environmental benefits while haulers often interpret it as a low

impact and high-risk burden. One might argue that blue wrap currently gets transported to landfills and can similarly be transported to haulers that do recycle this material. While it's true that blue wrap already gets transported, diverting it to a hauler that recycles it would dramatically increase transportation costs. This is because medical facilities have easier and often closer access to landfills than they do haulers that recycle blue wrap. Additionally, collected blue wrap can be "too voluminous to be economically freighted without being baled" which most hospitals cannot afford to do ("The ultimate guide to sterilization wrap recycling and repurposing at your hospital", n.d.). Ultimately, it is local haulers who determine whether a blue wrap recycling program can function in a particular area. But their participation is shaped not only by local logistics and facility relationships but also by larger national and global market forces that dictate what materials are worth recycling. This means that hospitals often do not control the outcome of recycling programs. Whether blue wrap is collected and processed depends largely on its market value, which is determined by external factors like global demand for polypropylene and international trade policies. If prices drop or contamination risks rise, haulers may opt out of collecting it altogether. As a result, even the most well-intentioned hospital initiatives can stall or fail entirely if haulers are unwilling or unable to participate.

Multi-level hospital support is necessary for a successful blue wrap recycling program. Cooperation from various relevant social groups is essential for both implementation and long-term sustainability. While most successful programs begin as "grassroots efforts", often led by operating room staff who notice that the blue wrap "covering sterile surgical kits was nearly as clean going into the waste stream", their long-term success depends on broader institutional commitment (Trunick, 2011). This highlights the interpretive flexibility of blue wrap. While some hospital staff may see it as trash, others reinterpret it as a clean, valuable material worth

recovering. Programs like Blue Renew make it clear that hospitals themselves must initiate and manage the process. In the Blue Renew* Implementation Questionnaire, which also serves as an application to the program, it is explicit that Halyard Health takes “no responsibility for non-Halyard sterilization wrap materials placed in the waste stream” (BLUE RENEW* Implementation Questionnaire, n.d.). This implies that the responsibility for proper implementation is entirely that of the hospital and not the manufacturer, reinforcing the need for strong internal coordination and oversight.

Education plays a critical role in this process, especially as hospitals experience high “employee turnover, traveling support, and contractor support” and regular onboarding that emphasizes sustainability ensures that new staff are aware of recycling expectations and protocols (MacKenzie, 2024). A motivated and well-informed team is more likely to engage in careful sorting and handling of blue wrap, increasing the likelihood that blue wrap used in the hospital remains clean and recyclable. However, just educating employees is not enough. The Blue Renew application asks whether a hospital has a Green Team in place and whether corporate leadership supports the initiative deeming these questions “very important to understanding [a hospital’s] capabilities in starting a recycling program”(BLUE RENEW* Implementation Questionnaire, n.d.). This implies that aligning sustainability goals across staff, sustainability committees, and corporate leadership can increase the likelihood of access necessary resources, accountability, and continuity to keep a blue wrap recycling program running. The questionnaire even explicitly states if the applicant does not have corporate approval, “it is a good idea to contact your corporate office and align this program with your sustainable leaders” (BLUE RENEW* Implementation Questionnaire, n.d.). An established large-scale blue wrap recycling program such as Blue Renew recognizes that without this

multi-level engagement, even the most enthusiastic efforts from individual departments risk being undermined by a lack of institutional support. A potential argument against multi-level hospital support may point out that grassroots initiatives are sufficient on their own, given the success of past programs that began informally within operating rooms. However, this underestimates the logistical and structural challenges involved in maintaining long-term recycling practices in complex healthcare environments. The result is, interpretive flexibility and shared commitment across relevant social groups in hospital hierarchies are crucial for the long-term sustainability of blue wrap recycling.

Conclusion

Understanding the factors that contribute to a successful blue wrap recycling program and the barriers that hinder its implementation is essential for creating more sustainable hospital waste systems. This paper highlights how blue wrap is influenced by a network of stakeholders, from hospital administrators to waste management personnel, each shaping how this material is handled and disposed of. Using the Social Construction of Technology framework, it becomes clear that blue wrap recycling programs are not just technical solutions but socially influenced arrangements. As interest in sustainable healthcare practices grows, recognizing these layered dynamics becomes important. Interventions that focus only on equipment or infrastructure can overlook the importance of the social and behavioral aspects. Collaborative recycling efforts such as those centered on blue wrap must be designed with this in mind. Based on these findings, I recommend that hospitals focus on building partnerships with committed haulers, ensure multi-level coordination within the hospital, and pursue recycling solutions only when they are logistically and economically viable in a given regional context, rather than adopting one-size-fits-all approaches. By viewing blue wrap not just as waste but as a material with social

meaning and systemic implications, hospitals can begin to see waste management as a space for ethical and institutional transformation.

I hope to shed light on the political, logistical, and cultural structures that shape hospital sustainability efforts especially regard blue wrap sustainability. Future research could benefit from interviews with healthcare providers involved in blue wrap handling and disposal, which would provide grounded insight into both everyday challenges and opportunities for change. Ultimately, blue wrap recycling can be a starting point through which hospitals reevaluate their environmental roles. By treating waste management as a space for innovation and ethical responsibility, institutions can more meaningfully align their internal practices with the health and well-being of the communities they serve.

References

Bahk, M. S. (2024). Smart Sterilization Container Technology: Blue Wrap Innovation. *Journal of Orthopaedic Experience & Innovation* 5 (1). https://doi.org/10.60118/001c.87966

Barriers to recycling healthcare plastics: HPRC. Healthcare Plastics Recycling Council. (2023, June 8). https://www.hprc.org/barriers-to-recycling-healthcare-plastics/

Halyard. (n.d.). BLUE RENEW* Implementation Questionnaire. https://www.halyardhealth.com/wp-content/uploads/blue-renew-questionnaire.pdf

Brooks, T. (2022, July 28). *Polypropylene #5 plastics classified as "widely recyclable" despite less than 30% of Americans having access to recycling systems that accept it*. Greenpeace USA. https://www.greenpeace.org/usa/polypropylene-5-plastics-classified-as-widely-recyclable-despite-less-than-30-of-americans-having-access-to-recycling-systems-that-accept-it/

Bodkin, C. (2018, November 1). *Blue wrap and the circular economy*. Practice Greenhealth. https://practicegreenhealth.org/about/news/blue-wrap-and-circular-economy

Bovee, P. (2024, August 28). *Why is polypropylene (PP) so difficult to recycle?* Cleantech Group. https://www.cleantech.com/why-is-polypropylene-pp-so-difficult-to-recycle/

Chariot Energy. (2024, February 13). *How long does it take for plastic to decompose?* Chariot Energy. https://chariotenergy.com/blog/how-long-until-plastic-decomposes/

De Lissovoy, G., Fraeman, K., Hutchins, V., Murphy, D., Song, D., & Vaughn, B. B. (2009). Surgical site infection: Incidence and impact on hospital utilization and treatment costs.

American Journal of Infection Control, 37(5), 387-397. https://doi.org/10.1016/j.ajic.2008.10.001

Eldred, S. M. (2023, May 16). *When did Americans start recycling?* History. https://www.history.com/articles/recycling-history-america

Environmental Protection Agency (EPA). (2002, November). Reusable Totes, Blue Wrap Recycling, and Composting: Environmental Best Practices for Health Care Facilities. Retrieved from https://19january2017snapshot.epa.gov/www3/region9/waste/p2/projects/hospital/totes.pdf

Flanders, S. (2017, October 25). *The circular economy in healthcare: An opportunity for sustainable change*. Circular Economy Blog. https://circulareconomy.blog/

Halyard Health. (2024, September 19). *Hospital sustainability with Blue Renew: Halyard*. HALYARD Global Products. https://www.halyardhealth.com/sustainability

Healthcare Plastics Recycling Council. (n.d.). *How to select a hospital plastics recycling strategy*. https://www.hprc.org/resources/how-to-select-a-hospital-plastics-recycling-strategy/

Lin, C., Paengsri, P., & Yang, Y. (2023). Impact of China's National Sword Policy on waste import: A difference-in-differences approach. *Economic Analysis and Policy, 78*, 887–903. https://doi.org/10.1016/j.eap.2023.04.033

MacKenzie, M. (2024, April 23). *The way forward for sustainability in healthcare*. Healthcare

Purchasing News. https://www.hpnonline.com/sourcing-logistics/article/55001580/the-way-forward-for-sustainability-in-healthcare

Meyer, M. J., Chafitz, T., Wang, K., Alamgir, N., Malapati, P., Gander, J. W., ... & Gandhi, S. (2022). Surgeons' perspectives on operating room waste: Multicenter survey. *Surgery, 171*(5), 1142-1147. https://doi.org/10.1016/j.surg.2021.12.011

Minnesota Technical Assistance Program (MnTAP). (n.d.). Reduce blue wrap waste with sterilization containers. Retrieved from http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Healthcare/Reduce-blue-wrap-waste-with-sterilization-containers.pdf

Ogden, J. (2009, April 1). Blue wrap recycling: It can be done! *AORN Journal, 89*(4), 739-738. https://doi.org/10.1016/j.aorn.2008.12.024

Piser, A. (2024, April 11). *The elements of hospital waste reduction*. Daniels Health. https://www.danielshealth.com/knowledge-center/elements-hospital-waste-reduction

Pinch, T. J., & Bijker, W. E. (1984). The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social Studies of Science*, 14(3), 399–441.

Save, D. (n.d.). *Where does hospital waste go? Medical waste disposal explained*. CleanRiver. https://cleanriver.com/resource/blog-where-does-hospital-waste-go-medical-waste-disposal/

The ultimate guide to sterilization wrap recycling and repurposing at your hospital. Circular Blu. (n.d.). https://circularblu.com/the-ultimate-guide-to-sterilization-wrap-recycling-and-repurposing-at-your-hospital/#:~:text=Obstacles%20to%20Recycling,budget%20for%20a%20baling%20machine

Trunick, Perry (2011, October-December). The Hard Case for Blue Wrap Recycling. *Medical Waste Management, VII(4)*, 1–8.

Wang, Q., Eze, V. C., Verla, E., & Enyoh, C. E. (2022). Assessment of potentially toxic metals adsorbed on small macroplastics in urban roadside soils in southeastern Nigeria. *Journal of Hazardous Materials*, 436, 129120. https://doi.org/10.1016/j.jhazmat.2022.129120

Workman, M. (2017, September 2). That's a wrap: The Blue Renew program is helping hospitals across the country recycle PP blue sterilization wrap by connecting them with recyclers that shred and densify the material. *Recycling Today*, 28-29.